The Convulsive Treatment of Mental Disorder

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Among the physical methods of treatment of mental disorder, convulsive methods give the most positive results. They consist in the artificial induction of convulsions, very much similar to epileptic seizures, by means of pentamethylene-tetrazol or electric current. The original working hypothesis (VON MEDUNA) was an alleged biological antagonism between Schizophrenia and Epilepsy, which has been mainly disproved.

Both methods are simple in operation and comparatively safe. Accidents have happened when risks were taken because the course of the Psychosis would have led to death if no active treatment was carried out; but these do not amount to more than one in a thousand. In my experience of thousands of convulsions, after careful physical selection, no fatal accidents have occurred. Standard contra-indications are evidence of myocardial damage, failing circulation, hyperpiesis, tuberculosis and renal disease.

Indications for treatment are all affective syndromes whether the emotional disorder is either dominating or determining the clinical pattern. In depressions it is almost specific and in Schizophrenia, Paranoid states, and Obsessive-Compulsive syndromes with dominant affective symptoms treatment is beneficial in many cases. Mania appears to be somewhat refractory unless treatment is intensive and prolonged. In the psychoneurosis and especially in Anxiety States the treatment is not effective and in most cases inadvisable.

The electric method introduced in 1937 by CERLETTI and BINI is the most extensively used, but some observers claim results with pentamethylene-tetrazol where the former fails.

Pentamethylene-tetrazol is injected intravenously very rapidly in doses which vary between 3c.c. to 15c.c., but much larger doses have been used. Patients react differently and it is found that they get used to the drug during the course of treatment and doses must be increased progressively. The same dose or more may be repeated after a few minutes if no convolution occurs and a third dose may be given with impunity.

The seizure is best described as epileptic, although some variations from the usual pattern may be observed. It takes place within five to fifteen seconds after the needle is withdrawn and the patient usually emits a cry and opens his mouth wide, forcibly and slowly, during which an assistant holds his jaw in such a manner as to prevent a possible dislocation. Patients usually experience a distressing sensation of passing out and for this reason may refuse further treatment or might have to be restrained. The convolution lasts between 15 to 50 seconds and there is usually a brief period of apnoea terminated by a deep inspiration. Some become restless afterwards, but many go to sleep. Normality returns usually within half-an-hour.

With electric current the convolution obtained is similar. It is produced from a machine using alternating current from the mains. The range of voltage is from 80 to 150 and the duration of exposure from 1/10 to 1/2 second. The current is passed to the brain by means of an electrode system applied or clamped to the scalp on the temples. The current which flows through the head is in the order of 1/2 to 1 Ampere. If passed through the heart it is likely to set up a fatal ventricular fibrillation and would be very unpleasant if passed through any
other part of the body apart from the head. For all that, none of the patients are aware that they have received an electric shock. The amount of current required to produce a convulsion cannot be determined beforehand because the head does not obey Ohms law. In order that a fit may be induced it is necessary that a large area of the cortex is stimulated at once and that the stimulus must be repeated a number of times before a convulsion occurs. It is accepted by electro-physiologists that an effective electric stimulus is one which occurs at the negative pole of the stimulating current. If this rule holds with the brain we may assume that when an alternating current is applied to it, stimulation will occur at each negative half-cycle, and in this manner for an exposure say of 1/5th of a second to a 100 cycle alternating current, there will be 20 effective stimuli for each hemisphere.

Once we cannot determine beforehand the appropriate voltage required to produce a fit we begin a course of treatment by using a standard medium setting, say of 100 volts for 1/10th second. If the fit occurs immediately the same setting may be used for subsequent treatments, or may be slightly reduced, though no harm results from using an over-strength stimulus. The convolution usually follows in about one second but may be sometimes delayed. If the stimulus was not sufficient a higher voltage or an increase in the time interval may be necessary to obtain a fit. Very rarely we fail to induce a convolution with the highest setting allowed by the apparatus, but in these cases we generally succeed if we repeat the stimulus several times. If this method also fails the convulsive threshold may be lowered by giving Benzedrine before treatment.

The patient does not experience any discomfort if the first stimulus fails as he is usually stunned. Unlike pentamethylenetetrazol the effect of the electric stimulus is instantaneous and the patient has complete amnesia for the shock.

In both drug and electric therapy the number of seizures necessary to procure a remission of symptoms is best determined according to the individual results obtained. The frequency of treatment is usually governed by criteria obtained with experience. In severely depressed patients treatment at first is best given daily and then tapered off at increasing intervals; 5 or 10 seizures are usually sufficient. In Mania good results are obtained by two daily treatments at intervals of half-an-hour between each convolution. For Schizophrenia treatment on alternate days is usually sufficient and should be prolonged to 20-30 seizures according to the results obtained. In all cases where improvement takes place the treatment is carried out at greater intervals until one is satisfied that recovery has occurred.

Complications noted are dislocations, most commonly of the jaw or shoulders, and fracture of long bones and spine, resulting from the violence of muscular contraction. In Malta fractures of long bones have never occurred. Compression fractures are not of much significance. Curare is sometimes used to minimise these complications. I have personally observed four lung abscesses, two of which after pentamethylene-tetrazol, and probably due to a mobilisation of a thrombus at the site of the injection. Prolonged apnoea with extreme cyanosis at the end of the convolution is often very alarming and artificial respiration may have to be resorted to. Cardiovascular complications are rare if patients are carefully selected before treatment.

Cerebral complications have never been seen during or after electric shock. Evidence has been accumulated which indicates that brain damage is possible with this form of shock therapy, although no clinically recognisable signs of organic changes have been detected. Temporary loss of memory is usually noticeable and with intensive methods this may lead to mental confusion which, however, clears soon after the cessation of treatment.

The mode of action of convulsive treatment is still unknown, and the method remains empirical. It is obvious however that
the induction of repeated epileptic fits produces extensive physiological activity with accompanying alteration in the flow and alteration of the blood. As HEMPHILL puts it "it is possible that these changes may help in the correction of certain physiological disturbances which may influence to a considerable extent the picture of the mental illness. It was noticed that in schizophrenic patients the least improvement was in those in whom delusions and hallucinations were prominent and in whom the general appearance was that of normal bodily health. Even among the chronics, the retarded type with stagnant circulation showed the greatest tendency to improve. In the case of agitated involutional melancholies in whom there was already evidence of a complex physical disorder determined perhaps by malfunction of the pituitary, it is tempting to assume that alteration in the blood supply or perhaps direct stimulation have had a physical effect upon the pituitary or the frontal and neighbouring regions of the brain. It is in just such patients that the most favourable results have been claimed, for example, by FREEMAN after the operation of prefrontal leucotomy."

Convulsive treatment has the advantage that it can also be carried out in an out-patient clinic or in the home of the patient. Many patients are being treated in this way and hospitalization becomes unnecessary. This is a considerable advantage which is appreciated by patients and relatives and is conducive to better social adjustment.

As in every method of treatment in psychological medicine convulsive treatment should be accompanied and followed by active psychotherapy. The patient must be helped in every way and his ailment discussed, with suitable attempts at reassurance and interpretation of symptoms. It is a good practice not to let patients mix with psychotics, and relatives and nurses should be warned to refrain from discussing the illness with the patient. Special consideration should be given to occupation and the patient encouraged not to remain idle.