SHOCK-THERAPY IN PSYCHOSES: A POSSIBLE RATIONAL BASIS AND ITS CLINICAL APPLICATIONS, BASED ON THREE YEARS' EXPERIENCE OF ITS USE IN MILITARY PSYCHIATRY.

By G. Tayleur Stockings, M.B., D.P.M., Captain R.A.M.C.

[Received December 14, 1943.]

In spite of the voluminous literature on the shock-therapies which has appeared in recent years, there is as yet little unanimity of opinion among psychiatrists as to the value of the anoxic and hypoglycaemic shock-therapies, and their indications, possible scope and limitations in the treatment of psychoses. Most potent in perpetuating this unsatisfactory state of affairs have been the too-rigid reliance on masses of statistics in evaluating results of treatment, the oft-repeated statement that the therapy is purely empirical, and last, but not least, the unfortunate publicity which it received at its inception, the result being that lately there has been a tendency to discredit the therapy, and a growing scepticism as to its efficacy.

The purpose of this article is to present evidence for a rational basis of the treatment, following intensive experience since its inception in this country, including three years of its practical application in military psychiatry.

The Case-Material.

The case-material seen in military hospitals is especially suitable for study for the following reasons:

(1) It consists almost entirely of young and physically healthy patients of the age-group 18–35 years.

(2) The cases are nearly all of recent and acute onset.

(3) They are almost all cases of the psychotic types found in civilian practice—for in my experience there is no special type of "war psychosis."

(4) The prognosis untreated is the same as for civilian cases.

By far the commonest cases encountered are the schizophrenic—all types—and the mixed schizoid-depressive; the classical manic-depressive and chronic types of delusional psychosis are comparatively uncommon.

The principal difference between military and civil psychiatric practice is, in the former, the comparatively large percentage of patients brought for treatment in the very early stages of their disease. In civil life it is surprising how long manifest psychotic symptoms can exist before the patient is brought for treatment, whereas under military conditions any slight conduct abnormality or deterioration of efficiency is quickly detected in the unit, so that patients are referred to the psychiatrist long before they reach the chronic stage; the importance of this will be stressed later.

Rationale of the Treatment.

I consider the conditions commonly described as schizophrenia, affective, delusional and confusional psychoses to be all manifestations of a single organic cerebral disorder, consisting of a profound derangement of the oxygen-glucose metabolism of the brain-cells, which affects principally the centres concerned with the higher thought-processes, affective and intellectual functions. This condition, at first reversible, may, if long-continued, lead to permanent cerebral damage.

Clinically two main types can be distinguished—those which respond to convulsive (anoxic) shock, and those which respond to insulin (hypoglycaemic) therapy.

For these two groups I suggest the terms "dysoxic," or oxygen-disordered,

and " dysglycolytic," or glucose-disordered respectively ; i.e. in the first group the fault is primarily in the oxygen, in the second in the glucose, metabolism.

In the first group are found conditions characterized by depression of mood, apathy, retardation, persecutory delusional states with a setting of depression, anxiety, and strongly appropriate affective reaction. This would include the classical depressives, acute hallucinatory-paranoid states, and mixed depressive and schizoid-depressive types ; also some types of alcoholic psychoses.

The second group comprises cases showing elation and motor hyperactivity, excited and catatonic states, and cases with bizarre delusions and hallucinations, and the type with thought-disorder and emotional incongruity characteristically found with the hebephrenic form of schizophrenia. Mania, simple and hebephrenic schizophrenia and the delusional psychoses are typical examples. This group are almost all resistant to anoxic shock therapy, but respond favourably to insulin.

Although we have no direct method of confirming this hypothesis by direct observation of the metabolism of human brain-cells *in vivo*, the clinical and experimental evidence in its favour is impressive, and may be briefly summarized as follows :

(1) In acute psychotics, the clinical signs are those of an acute cerebral intoxication—especially the concomitant physical signs (cutaneous anaesthesia and hyperaesthesia, etc.).

(2) These disorders are favourably affected by anoxic and hypoglycaemic therapy, which directly influence the oxygen-glucose metabolism of the brain ; they are resistant to ordinary methods of psychotherapy.

(3) In the normal individual, experimental psychoses almost identical in form with these conditions can be induced by administration of certain drugs, e.g. mescaline ; these agents have been found to produce their effects by a direct action on the cerebral glucose-oxygen metabolism.

(4) Psychotic symptoms are found in conditions of interference with the normal oxygen-supply of the brain. Examples are lowered oxygen-tension in mountain-sickness and aviation-conditions, chronic respiratory obstruction in nasal disease, overbreathing and inhalation of certain gases (nitrous oxide and carbon monoxide).

(5) The beneficial effects observed in certain psychoses following the inhalation of CO_2-rich mixtures, when the action is again due to a temporary interference with the oxidative processes of the cerebral cells.

(6) In chronic psychotics, permanent and incurable residues are found, e.g. fixed delusions, apathy, and persistent hallucinations ; these can be explained by the presence of a permanent and irreversible physical change in the higher cerebral neurones and association-tracts. The presence of such changes in the brains of chronic schizophrenics has been demonstrated by the researches of Mott and other workers.

(7) Normal cerebral function is dependent almost exclusively on the use of oxygen and glucose.

Scheme of Treatment.

The scheme of treatment employed, bearing in mind these facts, will now be briefly described. First, I must emphasize that the two essentials for success are early diagnosis and prompt and vigorous treatment. It is, of course, useless to expect that, once the disease is established, damaged synapses and neurones can be replaced by means of any form of pharmacotherapy, however devotedly and assiduously applied. My experience leads me to believe that, in the acute hebephrenic types at any rate, the damage is done within the first few weeks, or even days, of the disorder ; and, further, that that damage is directly due to the dysglycolytic process and not, as has been recently suggested, to the over-enthusiastic use of pharmacotherapy.

The procedure which I employ for acute cases is as follows : Immediately the diagnosis of an acute psychosis of malignant (i.e. schizophrenic) type is made, anoxic shock-therapy by means of either the electrical or cardiazol method is started at once. My technique differs in no way from that usually employed, except in the frequency of application. For the first five applications shock is administered once daily ; experience has shown that it is useless to expect any response from shock-therapy on alternate days or less frequently. This may

sound drastic, but provided the patient is in good general health and co-existing physical disease is absent, there is no contra-indication. If the case is one of the dysoxic type, the patient will respond rapidly after four to five applications; as soon as a response is evident, the treatment is changed to a regime of shock on alternate days, or thrice weekly, until a complete abolition of symptoms has been obtained. The average total number of shocks required to obtain this result has been found to be nine to ten, after which the treatment is discontinued.

If, however, the case shows no signs of improvement after four to five shocks, or relapses or fails to make further improvement after the full course of ten, then it is considered to be of the dysglycolytic, and therefore more malignant type. Shock-therapy is then discontinued, and insulin commenced forthwith. The technique employed for this is in no respects different from that usually described.

In my opinion anoxic and hypoglycaemic therapies act very quickly, if they are going to produce a favourable response at all. The possible causes of failure to produce a response will be briefly indicated later.

The advantages of this intensive therapy are the rapid suppression of such symptoms as restlessness, refusal of food, and suicidal and destructive tendencies and the need for frequent sedation, with their consequent nursing difficulties. The patient shows rapid physical improvement and becomes more accessible to psychotherapy. The principal result aimed at is, of course, the arrest of the disease-process before incurable cerebral damage is produced.

In acute depressives the procedure followed is the same as for the acute dysoxic type; usually a remission is obtained after four to five shocks. If the case fails to show any improvement after this number of applications, then the case is one of acute hysterical or anxiety-reaction, and not a true psychotic depression; these cases are very common in military practice, and I have found the response to anoxic shock to be the most reliable diagnostic test.

For the milder psychotic cases anoxic shock is administered two to three times weekly, instead of once daily; if no improvement is noted after ten shocks it is discontinued and insulin therapy is commenced in the usual way.

Results of Treatment.

In military psychiatric practice it has been found that in all types of cases treated by these methods, a complete remission may be expected in approximately 70 per cent., definite improvement in 15 per cent., and failure in 15 per cent. The last two groups consist mainly of the more chronic cases.

My experience of the relative values of the two forms of therapy is in complete accordance with that of other workers, viz. that anoxic shock is the treatment of choice for depressives, but is relatively ineffective for the hebephrenic form of schizophrenia and the delusional (paraphrenic) psychoses. I have found that hebephrenics and paraphrenics are either completely resistant to anoxic shock, or make a dramatic remission after a few shocks, to be followed only by a complete relapse on discontinuing the treatment. If treated in the early stages of the disease with insulin, however, they stand a good chance of making a complete and lasting remission, and there is no justification for the pessimistic view commonly held with regard to these cases. The poor results obtained in civil practice with these cases can be explained by the fact that, as these conditions are almost always of insidious onset, the vast majority are already in the chronic stage when brought for treatment. The simple form of schizophrenia with purely negative features has been found to be the type with the worst prognosis. Insulin-therapy is always ineffective, and, although they often make a dramatic temporary improvement with anoxic shock, they invariably relapse and deteriorate on discontinuing treatment. These cases are probably from the beginning examples of a purely degenerative form of brain disease, and should be considered as in a class by themselves.

Alcoholic psychoses of the hallucinatory-paranoid type without evidence of dementia have been found to respond excellently to anoxic shock.

In cases treated with insulin the average number of comas found to be effective in producing a lasting remission has been found to be 20 to 40. In all cases which are going to respond, signs of improvement become evident after the first half-dozen or so injections, and long before the coma-dose is reached.

With regard to the simultaneous use of insulin and anoxic shock in combination, I have found resort to this to be very rarely necessary.

Failure of Treatment.

Failure to obtain a satisfactory response may be due to the following causes:

(1) A case admitted with florid symptoms, which responds well at first, but shows persistent residual signs is almost always a case of long duration, the florid symptoms present on admission being merely an acute exacerbation.

(2) Failure to institute insulin treatment sufficiently early in the course of the disease.

(3) Insulin-resistance in dysglycolytic cases; failure to produce coma with a dosage of 150 units or over is invariably a bad prognostic sign.

(4) Forced abandonment of treatment on account of intercurrent physical disease.

With regard to the failures, I have found only one type of case which may be definitely made worse as the result of treatment, namely, chronic quiescent schizophrenics, who have only mild residue and have made a partial social adaptation. In these, shock-therapy may actually precipitate an exacerbation in the form of an acute hallucinatory-confusional episode. In consequence I consider the treatment to be definitely contraindicated in these cases. The explanation of this phenomenon is obscure.

Complications.

The incidence of major complications has been extremely small. In a series of nearly 300 cases treated with anoxic shock (cardiazol, triazol and electrical) I have encountered only two fractures—one vertebral and one scapular—and one simple dislocation of the shoulder-joint, none of which were followed by serious sequelae.

I have had one case of acute cardiovascular syncope; this occurred in an apparently healthy schizophrenic following a repeat dose of electro-convulsive therapy. The patient exhibited complete cessation of the heart and respiration with asphyxia pallida; vigorous artificial respiration and intravenous coramine were immediately effective, and no serious after-effects were observed. This very alarming complication was apparently due to idiosyncrasy on the part of the patient.

Of minor complications may be mentioned headache, muscular pains, painful spine without radiological evidence of fracture, dislocation of the jaw, and left-sided cardiac pain localized to the apex-beat. These have nuisance-value only, and require symptomatic treatment.

No major complications have been encountered in insulin-therapy. Minor complications have included delayed after-shock, transient mental confusion lasting 12 to 24 hours following recovery from coma, delayed recoveries from coma, and metabolic reactions consisting of pyrexia, profuse sweating, rigor and malaise. The method of dealing with these has been that laid down in standard works on the subject.

Contraindications.

These have been the same as those laid down in standard works on the subject.

Summary.

(1) The results of three years' experience of shock-therapy in military psychotic casualties are presented and discussed.

(2) Clinical and experimental evidence is presented for an organic basis of the conditions described, and a probable pathology is suggested.

(3) A rational basis for the anoxic shock and insulin therapies is suggested.

(4) The importance of early diagnosis and treatment is emphasized.

(5) The value of hypoglycaemic shock-therapy and the comparative ineffectiveness of anoxic shock in hebephrenia are confirmed.

(6) The high degree of safety of these therapies is confirmed.

My acknowledgments are due to Lieut.-Col. R. W. Armstrong, R.A.M.C., for kindly providing the facilities for carrying out the treatment, and for permission to use the case-material described in the compilation of this article.