

INSULIN TREATMENT IN NEUROSIS.*

By DALTON E. SANDS, M.R.C.P.Ed., D.P.M.,
Deputy Medical Superintendent, Sutton Emergency Hospital.

IN recent years the scope of various physical psychiatric treatments has been defined more clearly. Broadly speaking, continuous sleep for acute and subacute anxiety reactions, electro-convulsive treatment for depressions, insulin comas for schizophrenia with or without fits, malaria for G.P.I., and so on. In 1941 my colleagues, Drs. Sargant and Craske, described a modification of insulin shock therapy for treatment of war neuroses in the Services. In 1944 we find the method maintaining its effectiveness, its indications more definite, its scope widened through trial in various psychiatric states, and checked by control experiments. From the 850 odd patients so treated at Sutton I have selected some 320 as the basis of this paper, whose courses of insulin I have given personally. The great majority of this number are civilians, and the forms of their illnesses do not differ materially from those familiar in peace time. In properly chosen cases the results are as satisfactory as with Service personnel. The treatment is free from the potential dangers of other physical methods.

To outline the procedure.—Insulin is injected intramuscularly at 7 a.m. in quantity sufficient to produce a mild hypoglycaemic state, *not* amounting to light coma, with perspiration, flushing of the skin, and some drowsiness from which the patient can readily be roused to take breakfast at 9.30 a.m. Individual requirements in obtaining such hypoglycaemia vary from 10 to 100 units. The initial dose is 10 units, and is increased by 10 units daily until mild hypoglycaemia is evident. This degree of hypoglycaemia is terminated by the ordinary breakfast menu of the day, together with 12 oz. of mashed potatoes, the potatoes serving as substitute for glucose, since our supply of the latter is sufficient for emergency use only. If a patient shows signs of slipping into sopor he is at once aroused by a glucose drink and then given potatoes and breakfast. If unable to drink spontaneously, glucose is given by nasal tube or intravenously, though efficient nursing attention will prevent this stage being reached in all but a few cases. Late hypoglycaemic symptoms in the afternoon are rare provided that the intake at breakfast and lunch is satisfactory. While it is advisable to have the materials for the administration of glucose by nasal tube or intravenously at hand, in practice they are rarely needed, 1 per cent. needing intravenous and 5 per cent. requiring oral interruption with glucose. Treatment is given six days a week for two to five weeks, i.e. until gain in weight is no longer observed. The patient is weighed before treatment and then at weekly intervals, wearing pyjamas, or shirt and trousers only. During treatment a doctor should be on call, but with a well-trained staff he need only be present occasionally.

Complications are few. Excessive hypoglycaemia has its own remedy, as described. Patients are only allowed local leave while the course is proceeding, and if out of the ward they are supplied with a 2 oz. bottle of 33 per cent. glucose and are accompanied by another patient or staff. Occasionally a temporary mild excitement occurs towards the close of the hypoglycaemic period, chiefly amongst hysterics. Sodium amytal, gr. iij, or gr. vj, or phenobarbitone, gr. j, at 7 a.m. or 8 a.m. as required, will control this difficulty. Where the psychiatric symptoms of anxiety or hysteria are associated with an epileptic constitution, the hypoglycaemia may precipitate a fit, usually succeeded by some restlessness and excitement. Glucose should be given orally or intravenously at once, and subsequent treatments continued with the aid of epanutin or phenobarbitone *i.d.s.*

* Read at the Quarterly Meeting of the Royal Medico-Psychological Association, at 11, Chandos Street, London, W. 1, on February 24, 1944.

In general terms the *indications* for using insulin are (1) to accelerate or to initiate recovery in anxiety, in hysteria, and particularly in neurasthenic states of exhaustion or irritable weakness; (2) to aid other physical methods in the treatment of depressions and the most acute anxiety states. In either event the treatment is only of value where these clinical states are associated, as they often are, with metabolic change, producing loss of weight. A loss of 7 lb. in acute and 12 lb. in chronic cases is approximately the smallest change worth considering significant. Microcytic anaemia of iron deficiency type, and less often vitamin deficiency, are sometimes associated with this loss. This physical approach must be supported by as much psychotherapy as is possible during a few weeks' in-patient treatment, e.g. exploration under sodium amytal, and other short and practical psychotherapeutic techniques. Occupational therapy and finally environmental readjustment are also necessary.

As regards the chief clinical types, in depression this treatment does not influence the fundamental mood disorder at all. It is only indicated where (a) it is desired to improve the physical state of debilitated patients prior to giving convulsion therapy, and (b) in subacute depression, where the illness is mainly exogenous and essentially reactive to nutritional and social causes. I have in mind cases such as that of the small shopkeeper in a bombed area living in a gloomy, leaky, and often insanitary patched-up portion of a house, with his living attenuated by war-time restrictions, and many of his former clientele evacuated. It is no use telling them to start business somewhere else, and alternative local accommodation is usually not to be had. The prognosis under convalescent regime would be good, but they cannot afford three to six months for this. Their recovery can be stimulated to occur in three to six weeks by aid of insulin and some practical psychotherapy without their being worried too seriously by the financial loss entailed in hospital care. They can be fitted to carry on till times improve, and in such cases induced fits are not indicated in a first breakdown.

In acute anxiety state associated with loss of weight, the sense of well-being that insulin engenders accelerates the effect of continuous sleep, or of milder sedation with psychotherapy, in securing relief from tension and restoration of confidence. If a full course of continuous sleep is required insulin should be given either before or during the course, and I find a combined insulin-sleep method, on which I have been working recently, most useful where much tension and malnutrition exist together. The insulin regime in the morning is employed not as a safeguard for prolonged sleep, but for its own effect on the patient's physical and psychiatric condition. Continuous sleep is given for the rest of the day and night. The combination is not dangerous in practice, provided the staff are experienced in the manifestations of hypoglycaemia and the food and fluid intake ample.

The typical chronic anxiety state who has not lost weight rarely benefits with insulin. These cases should be distinguished, when considering insulin, from recurrent forms of anxiety where attacks occur at intervals of a year or more and may frequently show weight loss. In these cases insulin and psychotherapy produce a good remission and the role of sedation is minimal. The attacks are shortened, but relapses are likely to continue unless diminished by psychotherapy and special environmental readjustment.

In hysteria and in mixed conditions of anxiety and hysteria with weight loss, modified insulin is easily the most effective physical method. In fact, shock treatments are useless and can be harmful. Acute and chronic cases both respond well, often achieving a substantial measure of spontaneous improvement even before psychotherapy has been applied. Except where obvious conversion symptoms are present psychological treatment can, if necessary, be deferred until there is physical gain. It can then be given with greater effect and economy of time. There is one type of patient in the group needing particular reference, namely the anxious or hysterical patient with much irritability and weakness, suspicious, paranoid trends, and in conduct almost making an aggressively psychopathic impression. On admission such patients make wild and hostile statements, and adequate rapport for psychotherapy is difficult. After two to three weeks on insulin the flow of complaints about their ward conduct ceases, they begin co-operating, show symptomatic improvement and, in fact, a personality change for the better akin to that of the recovering psychotic. Their recovery can then be completed by psychotherapy.

Mode of action.—This is mainly metabolic and to a lesser degree psychological. It is probable that in human beings, as in other intact animals, the administration of insulin causes increased utilization of sugar by the tissues, increased storage of glycogen by the muscles and liver, metabolism is increased and the respiratory quotient rises. Furthermore, the brain metabolises carbohydrate as its main source of energy. Appetite is stimulated to a point quite beyond the patient's expectations and the increase persists throughout the day. I have known patients of previously poor appetite rather sheepishly admit to having two full teas, one in a local café and the other in the ward, in close succession. I would confirm Dr. Sargant's observation that if there is a failure to gain weight one is probably treating an unsuspected chronic case who has not really lost weight, but is constitutionally thin. A photo taken a year or two back is often more reliable and informative than patients' statements about their weight. They generally exaggerate the amount lost. Apart from this, I would add that failure to gain weight should stimulate search for undiscovered organic or functional illness, e.g. depression, though chronic conditions, such as bronchiectasis or G.P.I., did not noticeably limit the physical effect of insulin.

So pronounced a metabolic change, with weight increasing up to 1 lb. and more daily with a growing sense of well-being, can scarcely fail to be without suggestive psychological effect. With the sweating, flushing and drowsiness and keen appetite, the patient feels that something significant is being done for him, his faith in his treatment and himself begins to rise and the first step in the restoration of self-confidence is made. In these matters the control series showed a different picture which I will mention later.

Results.—Only 163 results were reported, because in the other cases continuous sleep, electrically induced fits and so on, complicated the picture. In general, these findings parallel the indications given more than mere figures would suggest. A 60 per cent. recovered and much improved rate is found in anxiety states and mixed states of anxiety and hysteria. The same group in depressions is 45 per cent.—an indifferent result which contrasts with the 60 to 80 per cent. combined recovered, much improved rate that we are accustomed to find in treating depressions by electrically induced convulsions. These results from insulin treatment in neurosis showed that only 6 per cent. failed to make definite improvement. Patients were able to be discharged in three to four weeks. There was no perceptible change in the few obsessionals treated.

Follow-up records produced 16 per cent. relapsed in six months.

	Anxiety hysterias.	Anxiety states.	Hysterias.	Depressions.	
A { Recovered . . .	5 15.6%	15 24.2%	12 35.3%	9 25.7%	
Much improved . . .	15 46.8%	23 37.1%	4 11.8%	7 20%	
B { Improved . . .	10 31.3%	21 33.9%	15 44.1%	14 40%	
No change . . .	2 6.3%	3 4.8%	3 8.8%	5 14.3%	
Totals . . .	32 100%	62 100%	34 100%	35 100%	= 163
A (recovered + much improved)	62.4%	61.3%	47.1%	45.7%	
B (improved + no change)	37.6%	38.7%	52.9%	54.3%	

Controls.—Thirty patients were used for this purpose. In the first group of ten patients the insulin course was interrupted after six days by the substitution of sterile water for six days, after which insulin was resumed. Collectively these ten patients gained 32½ lb. in the first week with insulin, 10½ lb. in the second week on water, and 45 lb. in the third week when again on insulin. On water one patient lost 4 lb., and in another four patients the gain in weight was apparently uninfluenced by insulin. No sweating was observed while on water, though one female patient managed to become quite flushed. Several patients complained that their appetite was poor or that "the insulin was not acting." In fact the prestige of the treatment slumped considerably in the ward in the water week.

In the second group of 20 patients, the test was not done in all the insulin patients in the ward concurrently as in the case of the ten just mentioned. New patients,

as they started treatment in company with others more advanced in the course, were given sterile water injections for the first week and insulin thereafter. Comparing the first week on water and the second on insulin there was, on water, a total gain of $23\frac{1}{2}$ lb. in all patients and a loss of $7\frac{1}{2}$ lb., as against a total gain of $90\frac{1}{2}$ lb. and no loss on insulin.

In either group there was a 4 to 1 improvement in weight in favour of insulin. In the first group nobody was aware of any test being done but the dispenser and myself. In the second group the insulin had to be labelled and was prescribed as "special" brand insulin. The nursing staff remarked that they did not think it was very active in producing hypoglycaemia. The routine of treatment was kept constant throughout with the same diet and potatoes.

CONTROL SERIES.

GROUP A.—*Sterile Water Injections Substituted for Insulin.*

Number.	1st week : 6 insulin days. Change in weight.	2nd week : 6 water days. Change in weight.	3rd week : 6 insulin days. Change in weight.
1	+ $3\frac{1}{2}$ lb.	+ $\frac{1}{2}$ lb.	+ 3 lb.
2	+ 3 "	+ 1 "	+ $4\frac{1}{2}$ "
3	+ $3\frac{1}{2}$ "	+ 1 "	+ 3 "
4	+ $\frac{1}{2}$ "	+ 1 "	+ $3\frac{1}{2}$ "
5	+ 2 "	+ $\frac{1}{2}$ "	+ $3\frac{1}{2}$ "
6	+ 1 "	+ 2 "	+ 3 "
7	+ 2 "	+ $\frac{1}{2}$ "	+ 6 "
8	+ $2\frac{1}{2}$ "	+ $\frac{1}{2}$ "	+ 8 "
9	+ 5 "	+ 3 "	+ 4 "
10	+ 9 "	- 4 "	+ $6\frac{1}{2}$ "
	+ $32\frac{1}{2}$ lb.	+ $10\frac{1}{2}$ lb. - 4 "	+ 45 lb.

GROUP B.—*One Week of Six Daily Sterile Water Injections followed by One Week of Six Daily Insulin Injections.*

Number.	1st week : 6 injections of sterile water. Change in weight.	2nd week : 6 injections of insulin. Change in weight.
11	+ 1 lb.	+ 3 lb.
12	- 2 "	+ $4\frac{1}{2}$ "
13	- 1 "	+ 3 "
14	+ $2\frac{1}{2}$ "	+ $3\frac{1}{2}$ "
15	+ 3 "	+ 8 "
16	+ $3\frac{1}{2}$ "	+ $6\frac{1}{2}$ "
17	+ $\frac{1}{2}$ "	+ $2\frac{1}{2}$ "
18	+ 1 "	+ 4 "
19	+ 3 "	+ 5 "
20	No change	+ 4 "
21	+ $1\frac{1}{2}$ lb.	+ $7\frac{1}{2}$ "
22	+ $\frac{1}{2}$ "	+ 5 "
23	- $4\frac{1}{2}$ "	+ 9 "
24	+ 2 "	+ $4\frac{1}{2}$ "
25	+ 2 "	+ $2\frac{1}{2}$ "
26	+ $\frac{1}{2}$ "	+ 4 "
27	+ 2 "	+ 2 "
28	+ $1\frac{1}{2}$ "	+ 3 "
29	No change	+ 3 "
30	+ 2 lb.	+ $5\frac{1}{2}$ "
	+ $26\frac{1}{2}$ lb. - $7\frac{1}{2}$ "	+ $90\frac{1}{2}$ lb.

In discussion there are a few points of interest. (1) I believe that amongst psychiatric patients in general there is a limited but definite field for this treatment. The majority of suitable patients are to be found in E.M.S. psychiatric units, general hospital psychiatric O.P. clinics, and in the medical and surgical wards of such hospitals where the anxious and hysterical nature of the somatic symptoms

is often unrecognized. A relatively small number of mental hospital patients are likely to be found suitable for this treatment.

(2) As a mere weight restorer insulin has, of course, been used in other branches of medicine from time to time, including conditions of malnutrition in children; 5-10 units *b.d.* will not give the required result promptly in neuroses. It is necessary to produce clinical evidence of hypoglycaemia to the point of sweating, flushing and drowsiness.

(3) In both anxious and hysterical conditions a rapid gain in weight was usually, but not always, associated with improvement. If a patient does not gain at least 2 or 3 lb. in the first ten days of the course there is little use in persisting with it. Treatment is stopped when definite gain in weight ceases.

(4) To produce the relatively mild degree of hypoglycaemia that this form of treatment required, one could not fail to be impressed by the wide range of dosage involved, i.e. from 10 to 100 or more units of insulin.

Examination showed the hysterics to be twice as sensitive to insulin as any other group. This increase in sensitivity was entirely due to the conversion hysterics, numbering 16 out of 33 cases, all showing hypoglycaemia on 10 to 40 units of insulin (except one), while the rest required 50 to 100 units for the same clinical effect. The one exception was given 60 units, but became severely hypoglycaemic on three occasions and was reduced to 40 units. Generally speaking the more complete the conversion reaction the greater the sensitivity. The more hysteria was mixed with anxious, depressive or schizoid trends, the better was insulin tolerated. In other clinical groups a few patients were found who would not tolerate more than 40 units without severe hypoglycaemia. These were nearly all either in the 50 to 65 age-group, or possessed of hysterical components in their make-up. No schizophrenics were found so sensitive and the number of pure anxiety states was insignificant. Whatever the theoretical implications of these findings may be, the practical need to give small doses of insulin in conversion hysteria and to be wary in advancing years is obvious.

CONCLUSIONS.

In the treatment of selected neurotic patients we find a modified form of insulin treatment, developed at Sutton, to be a valuable counterpart to psychological measures. By its use in the limited field discussed we can give quicker and greater assistance to those patients whose fight to readjust has been sufficiently stern to be reflected in physical deterioration.

The treatment is essentially psychosomatic in type. Lasting benefit to the patient can be obtained when it is correctly employed in conjunction with psychological or even other physical methods.

I would like to express my thanks to Dr. Louis Minski, Medical Superintendent, for his helpful suggestions and advice.