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INSULIN COMA THERAPY

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Insulin Coma Therapy

Insulin coma therapy (ICT) for severe forms of schizophrenia, and for some anxiety and tension states, and for cases which fall under Hoch and Polatin's (1949) description of "pseudoneurotic schizophrenia," was one of the most helpful tools for psychiatry until the advent of tranquilizing drugs of the phenothiazine class. Some authors (Arnold, 1959; Dussik, 1959; Kalinowsky, 1969; and the author, 1969, 1966), as well as psychiatrists in East-European countries (Russia, Czechoslovakia, Estonia) are of the opinion that it is still capable of producing results which are far beyond the capability of other psychopharmacological agents. Most patients who are treated with antipsychotic drugs must remain on such a regime for the rest of their life, while a good many of our patients treated with ICT for a sufficient period, can subsequently lead normal lives, work, marry, and enjoy their friends, without having to take a daily pill in order to "remain normal."

Foremost in the minds of families and patients who fall ill with severe schizophrenia or intense anxiety-tension states is the question, whether this condition can be improved, cured and prevented from recurring.

In 1926, before Sakel (1933, 1938), one of the first psychiatrists engaged in experiments with insulin, which seemed to change a hitherto bleak prognosis, there was little hope in the opinion of most psychiatrists

consulted about schizophrenia and related states. This chapter is, of course, largely retrospective, since much to our regret insulin coma therapy in this country is virtually abandoned and many young professionals in the field, who have never worked with it, repeat the message to each other that it is dangerous and ineffectual.

However, it must be said that there are very few people today who have seen the powerful and lasting effects of this treatment when it was given with good technique and observation, by patient, highly trained crews of physicians, nurses, and aides who patiently dedicated their time to obtain optimal continued results for their patients, minimizing the potential dangers by continuous conscientious observation of the treatment in progress, and adapting the technique so that in the end there were no fatalities and only very exceptional undesired side reactions.

It is easy to condemn something that one does not wish to do anyway, but it must be said that a totally negative attitude deprives the patients of a last-resort treatment that could be very beneficial when other methods fail.

To the best of my knowledge, Russian, Czech, and Estonian hospitals have kept trained workers and proceed with ICT (this was also reported from Japan and India), while American and Western European countries have decided that it is too expensive to train and maintain workers and centers for

a treatment that overcomes the failures of chemical treatment in patients, thus allowing them to become chronic sufferers.

Research into the reasons for the effectiveness of insulin by Himwich (1940) and others is not conclusive, but might provide further information about the nature of schizophrenia which will only become available to researchers now when active study of the effect of hypoglycemia, thiamine and adrenalin, and glucagon (an antiinsulin hormone) is again undertaken.

When Sakel found insulin helpful in not only raising appetite in morphinists but overcoming schizophrenic symptoms after accidentally having caused coma, he decided that it was necessary to take risks to find lucidity and healthy mental functions, rather than chronic abject avoidance of reality through schizophrenic thought processes.

Insulin Coma Therapy

Insulin coma therapy is a more adequate name than insulin shock therapy, since in the most modern and effective versions, neither a state usually described as *shock*, nor a state of *convulsions* is considered necessary, desirable or, if it occurs too often, acceptable.

Time and Personnel Necessary for Treatment

The patient has to be treated five days a week from 6 or 6:30 a.m. till noon. It became possible with the safer introduction of coma (multiple insulin doses) and with the easier termination (adrenalin thiamine or glucagon IM injection) to have one registered nurse with three male and three female trained aides to observe fifty patients in ICT. Before the IM injections and with the older (Sakel or Shurley-Bond) techniques at least three registered nurses and five male and five female aids were necessary to give safe treatment.

Insulin Coma Combined with Electroconvulsive Therapy (ECT)

This combination was sometimes used in order to get quickly through a catatonic refusal to eat, or other conditions when the patient's recovery was in danger, because he made it difficult for himself. (It is important to have patients drink after hypoglycemic coma, even though tube-feeding can replace this function temporarily.) As a rule we did not want or need convulsive conditions because they force us to terminate the treatment early and thus lose part of a treatment day.

Bond and Shurley (1948) who tried to reach coma quicker, took more risks and increased the dose after reactions and side reactions. The patients sometimes developed protracted coma which seemed to help them for the moment but it was difficult with this method to give enough comas to

produce lasting results.

The "zig-zag" method of inducing coma by von Braunmühl (1942, 1947) was an early modification of Sakel's technique which he himself called the "classic method." Von Braunmühl observed that a patient who with daily increasing doses could not yet go into coma with 200 units of insulin and who the next day received only thirty units, could reach a deep coma on a subsequent day with 200 units easily.

Multiple Insulin Doses

Assuming that the resistance of human organisms to insulin could be the product of adrenal outpourings which are set off by administration of a large insulin dosage, this author (1960) tried small insulin amounts administered over more time (one third of the planned amount every fifteen minutes or every half hour in order to produce less adrenal stimulation). This proved effective in nearly 50,000 comas administered from 1951-1968; practically no prolonged coma of more than one hour was seen in our unit.

Advantages of Modern (Safe) ICT Technique

1. We can treat more patients with the same crew.
2. We need not fear protracted coma and secondary complications and risks.

- 3.The patients feel well enough to engage in other activities (occupational therapy, psychotherapy, group and family treatment, recreation, patient government, and milieu therapy.)
- 4.The slow awakening permits the study of the patients in preconscious states and influencing them therapeutically (Wallach, 1964).

Stages of Insulin Coma

- 1.Precoma: patient in drowsy somnolent condition, some cold perspiration, lowering of body temperature.
- 2.Coma (green stage): cortical loss of function, patient restless, not responding to questions but will respond to pain. May be used for several hours.
- 3.Coma (yellow or warning stage): *midbrain symptoms*, loss of pain sense except for supraorbital pressure, wide pupil, myoclonic and myotonic contractions. This stage allowed for fifteen to twenty minutes only.
- 4.Coma (red stage): medullary symptoms, miosis, complete affect medulla oblongata, loss of pain sense and reflexes, to be terminated in five minutes; positive Babinski reflex, slow pulse.

Colors are teaching devices, derived from traffic signals. By carefully observing the following rules, ICT can be made perfectly safe:

1. *Precoma* and
2. *Green* stage coma permitted if necessary all morning.
3. *Yellow* stage: not to last more than fifteen to twenty minutes before termination is begun.
4. *Red* stage: not to last more than five minutes until termination begins. This will avoid the
5. *Blue* stage (spinal phase) and complications.

Termination of Hypoglycemic Reactions

There are four possibilities:

1. Tube feeding with orange juice plus sugar or with a mixture of molasses and sugar.
2. Slowly administering 33 percent glucose (50-100 cc) intravenously.
3. Administering 0.5-1 mg. adrenalin mixed with 100 mg. thiamine intramuscularly.
4. Injecting 0.33-1 mg. glucagon (an antiinsulin hormone) intramuscularly.

Laqueur (1960; 1961) found that 0.50 mg.-1.0 mg. adrenalin by itself may awaken about one half of the coma patients and enable them to drink

sugar solutions by mouth. By adding 100 mg. thiamine (a substance that enables sugar to pass the blood-brain barrier but that does not have an effect on low blood sugar by itself) 80-90 percent of our deep-coma cases could be "lightened" enough so they were able to drink sugar water with molasses (which people in deep hypoglycemia like to take).

Afternoon Observations

With one aide for the males and one for the females (with one registered nurse on call) all "possible afternoon reactions" following that the introduction of the small multiple insulin doses could be handled. The patients could be outside, take part in sports, or have occupational and group therapy; they only could not be allowed to fall asleep in the shade by themselves without being observed, because then a dangerous hypoglycemic reaction might overcome them.

Indications

Insulin coma therapy worked very well with:

1. Paranoids.
2. Catatonics.
3. Mixed forms of schizophrenia.

4. True hebephrenic conditions (they occur rarely and ICT was very effective in some).
5. Anxiety and tension states (both neurotic and psychotic).
6. In schizoaffective depressed conditions where drugs and ECT had failed to bring results.

Contraindications

1. While there is no real evidence of damage done, it has been suggested that insulin coma should not be used in pregnant women, because of possible injury to the unborn child in the early phase when its own pancreas is not yet fully developed.
2. Cardiovascular disease may constitute a risk, and is always considered as such in persons older than fifty years.
3. Upper *respiratory* infections.
4. Lung diseases.
5. Renal diseases.
6. Other severe medical conditions are usually a reason against the use of ICT.

Insulin Coma Combined with Other Forms of Treatment

It is regrettable that this country appears to have abandoned the training of personnel and the organization of at least a few treatment centers (one for each region) where patients can receive this safe and helpful treatment when other approaches (psychopharmacology, milieu therapy, psychotherapy, ECT, etc.) fail. These patients are now again in the desperate situation that existed before the discovery of insulin coma therapy.

Insulin Coma and Milieu Therapy

Post-ECT patients, unless they were treated with the slower-working unilateral applications of electrodes, are often drowsy and little inclined to take part in afternoon and evening activities. The same is true for patients heavily medicated with phenothiazines, thiothixine, haloperidol, etc. Post-ICT patients are fit and eager on the same treatment day to take part in therapeutic activities.

Results

ICT "took," as the saying went, if patients left their psychotic state of apparent unconnectedness with reality for a "lucid" period after a coma. The first lucid period might only last five minutes, after a few comas it might increase to thirty minutes and, as the treatment progressed it might last all afternoon and evening. We learned that, if the treatment was disrupted at

that point, relapses might occur, but if forty to fifty continued ICT's were given after full "lucidity" was reached, we could count on permanent results. Continuity was very important.

Conclusions

Insulin coma therapy must be considered a useful form of treatment which has helped many schizophrenic patients. It is not used any more because other forms of treatment have taken its place for the greater part.

There are, however, cases where pharmacodynamic and milieu therapy, and many forms of group and individual therapy do not attain the full degree of remission which previous authors have seen and which permitted patients to return to normal living without having to use drugs continuously to remain free of symptoms (and having to fear that they would relapse if medications were interrupted.)

The costs of insulin coma treatment were not insuperable during the last few years of its use in the United States and Canada. Trained crews with the help of electronic controls and with the considerably higher degree of safety which the most modern methods of treatment (multiple insulin doses and glucagon termination) permitted, could treat more patients simultaneously than in earlier years.

With these modern methods this author treated fifty patients daily with a crew designed for the treatment of only twenty-five patients by the older method. In most patients deep coma was attained and not a single fatality occurred in more than 50,000 comas over seventeen years. Very few undesirable secondary reactions were observed, and all gave way immediately to secondary application of intravenous glucose or glucogen, or adrenalin- thiamine intramuscularly.

Subcoma insulin treatment is still occasionally used in the United States, as recommended by Leonard Cammer (1966), mostly in anxiety and tension states and subsequent neurotic depressions.

The pre- and post-coma states have been explored and used therapeutically by Wallach (1964), who used to observe this author's patients during their awakening from coma and talked with them during these preconscious phases before they returned to full lucidity. This is another safe way of reaching early memories and awareness; some of this psychotherapy has been performed by this author in many cases with the help of sodium amytal desoxyn interviews which were tape-recorded and played back to the patients. But we feel that deep hypoglycemia is in schizophrenics a better tool to reach such early and deep levels of repressed data held back in adult conscious states.

We must wait for information from other countries what the ultimate fate of insulin coma therapy shall be. In this country, revival of at least three or four reliable regional centers, where psychiatrists and nurses could perform this treatment, would be in the best interest of scientific and clinical psychiatry and is recommended by this author and by Lothar Kalinowsky in his writings.

We should not end this article without referring to the splendid review by J. Angst, of the University Psychiatric Clinic in Zurich (under Manfred Bleuler), who reviewed 227 recent publications in the field of insulin therapy and who left the question of its usefulness in today's somatherapies open (Angst, 1969).

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