Treatment of Ambulant Schizophrenics with Vitamin B_3 and Relative Hypoglycemic Diet

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The result of the treatment of 70 ambulatory schizophrenic patients with high doses of nicotinic acid or nicotinamide and evaluation and positive scores on the Hoffer-Osmond Diagnostic Test (HOD) is reported in this paper. Forty of these patients had been in hospital one or more times. One patient had amassed a total of 300 ECTs, one had been subjected to lobotomy, six were sufficiently disturbed to require hospitalization so that treatment could be started. Three patients resident in hospital at the start of treatment are still in residence but were dropped from this study because the administration of the medication was haphazardly supervised so that the patients could either take the tablets or discard them at will. All the patients have been ill for many years and all had been treated either by psychotherapy, hospitalization, ECT and chemotherapy or any combination of these. At present they have been in treatment with niacin and ascorbic acid for 3-9 months. In many of the cases an antidepressant was added when indicated. The results are shown in Table 1 (p. 24). These results on a particularly difficult group of patients are very encouraging and corroborate the findings of Hoffer et al. (1957).

In taking detailed histories of the presenting symptoms I was struck by the similarity of the first symptoms to appear early in the onset of schizophrenia and the outstanding symptoms of another disease resulting from the malfunctioning of the adrenal gland–relative hypoglycemia. In schizophrenia the usual early symptom is depression, because life becomes uncertain, frustrating, confused and difficult- One of the most common changes in schizophrenia is fatigue. In relative hypoglycemia the most disabling symptoms are recurring depression, fatigue, or exhaustion. Since relative hypoglycemia is known to mimic any neuropsychiatric disorder this study was begun in an attempt to determine the incidence of its occurrence in schizophrenia.

Despite the publication of innumerable scholarly papers related to hypoglycemia during the past 40 years the disease is still in most instances essentially undiagnosed, untreated or mistreated. Physicians seem either unwilling or unable to treat this malady with its merited respect. It has been recognized that hypoglycemia can be accompanied by marked psychic phenomena, i.e. depressive states, severe chronic exhaustion, anxiety and other symptoms which have so frequently been dismissed by physicians as quickly as they were relegated to the category of neurosis. It has been stated that hypoglycemia as a disease entity should be kept in mind constantly by all physicians, particularly those doing neuropsychiatric work, in the absence of a detailed history, the attacks of hypoglycemia may suggest brain disease or vascular accident and because of their paroxysmal nature may suggest epilepsy, amnesia, or hysteria.

Fabrykant and Pacella (1947) have demonstrated electroencephalographic changes in hypoglycemia. Another published report (Hoffman & Abrahamson, 1949) indicated that "mental patients do not mobilize the sugar in their body in response to mental stress." It stated that "the brain of the hypoglycemic is tired and ill-nourished. His fatigue has begotten apprehension and his apprehensions have given birth to distortions," With the elimination of the chemical and metabolic disturbance caused by the hypoglycemia, schizophrenic

Table 1. Response of Seventy Schizophrenics to Vitamin B_3 and Ascorbic Acid Therapy

Present Condition	Number	Symptoms Present	Symptoms Working	Relation to Family	Relation to Community
Well	0				
Improved	27	Yes	Yes	Improved	Improved
Improved	23	Yes	No	Fair	Fair
Not Improved	19	Yes	Some	Fair to Poor	Fair to Poor
Worse	I				

patients in this study responded more rapidly to niacin therapy.

Salzer (1966) states that relative hypoglycemia is a clinical syndrome in which patients develop symptoms referrable to any system of the body as a result of a relative drop in blood sugar level in response to a high carbohydrate food intake and beverages containing caffeine. In the past the syndrome has been called functional hyperinsulinism, essential hypoglycemia, functional hypoglycemia, hypoglycemic fatigue and neurogenic hypoglycemia. The accuracy of these older terms must be questioned inasmuch as a patient may present this syndrome when there is only a relative drop in blood sugar levels without an absolute drop into the hypoglycemic levels.

The major symptoms of relative hypoglycemia are:

Psychiatric: depression, insomnia, anxiety, irritability, crying spells, phobias, lack of concentration, forgetfulness or confusion, restlessness, unsocial or anti-social behavior, suicidal intentions.

Somatic: exhaustion or fatigue: excessive sweating, tachycardia , anorexia, cold hands or feet, joint pains, obesity, chronic indigestion or bloating.

Neurologic: headache, dizziness, tremor, numbness, blurred vision, muscle twitching or cramps, staggering, fainting or blackouts, convulsions.

The criterion for making the diagnosis used in this study was a drop of 20 mg% or more below the fasting blood sugar level during a 6 hour glucose tolerance test. A patient need not have a blood sugar drop into the hypoglycemic levels of 70 mg%, or below, but the diagnosis can be made for example in a patient whose fasting blood sugar is 114 mg%, and whose blood sugar drop to 78 mg% during the course of the 6 hours glucose tolerance test. A drop of 36 mg%, being involved. Similarly the fasting blood sugar need not be low, but is more frequently indeed within the accepted range of normal. Prolonged hypoglycemic states are characterized by a high initial curve falling off to marked hypoglycemic levels in the 3rd or 4th hour. (See Table 2, p. 26, Cases I.B.; U.W.)

Clinical Procedure

In all the cases reported here a 6 hour glucose tolerance test was done and a thorough dietary history was taken to determine exactly what was eaten at breakfast, lunch and supper, including the number of slices of bread, amounts of beverages containing caffeine and the type of snacks taken between meals and during the evening until retiring. In the overwhelming majority of cases the investigation of the dietary habits reveals a daily intake of abundant quantities of carbohy-

drates, sugars and coffee. Questioning parents of hospitalized schizophrenic patients about the food consumed during day visits at home showed that in all instances the patients feasted on carbohydrates, sweets of all kinds, sugar and large quantities of coffee. These dietary indiscretions feed the hypoglycemic mechanism with the resultant dropping of the blood sugar level and the production of symptoms.

Treatment consists primarily of a diet high in protein and fat and low in carbohydrate. Feedings between meals and every two hours throughout the evening until retiring is essential to prevent fluctuation of the blood sugar level. Caffeine is prohibited because it stimulates the adrenal gland; then the liberated adrenalin causes glycogenolysis in the liver and an elevation of the blood sugar level occurs only to be followed by a drop as in the case of eating carbohydrates. Fructose or levulose is utilized much more efficiently than dextrose since fructose does not require insulin in order to be metabolized. The diet therefore calls for fruit and fruit juices at and between meals and provides a source of immediate energy.

In addition to treatment with diet some of the patients received a series of 6-12 injections of calcium-glycerophosphate intraglutially. In general, the group which was treated with calcium improved more rapidly, according to Salzer. Calcium levels control the activity of an enzyme which when present elevates blood sugar levels. All patients take niacin and ascorbic acid (3-9 g daily).

Case Reports

Case 1

Male, age 23. Suffered from recurring depressions since age 18. Had ambulatory curring depression, extreme fatigue, confusion, inability to concentrate, extreme difficulty in working. HOD scores: TS-117; P-30; PA-7; D-14. (TS= total; P= Perceptual score; PA= Paranoid score; D= Depressive score). Experiential World Inventory "5 out of 8 scores are at or above the mean scores of the psychiatric group. This strongly suggests that he is a serious psychiatric problem, "...He goes through periods of work inhibition during which he floats as if out of time. When excited he is likely to get bombarded by sensory stimuli. Distortion in perception and strange body sensations then take place." Six-hour glucose tolerance test showed a fasting level of 80 mg%, a shallow rise to 116 mg% in H hour, falling off to 96 mg% in 1 hour and a drop to 33 mg% in the 4th hour. Treatment as outlined was instituted with dramatic improvement and recession of the major symptoms in 6 weeks. An HOD test repeated 8 weeks after treatment was begun, showed the following results: TS-10; P-0; PA-0; D-0. Clinically, patient seems to have made a complete recovery.

Case 2

Male, age 23. Suffered from recurring depressions since age 18. Had ambulatory shock treatments intermittently for several years with some improvement. At age 21 was hospitalized for 4 months following a suicidal attempt with sedative pills. One year later, he was again hospitalized for several months. On both occasions the discharge diagnosis was schizophrenia, chronic. He was seen in June, 1966 and the clinical impression was schizophrenia. The HOD scores were as follows: TS-100; P-19; PA-6; D-14. niacin and ascorbic acid therapy was begun with daily doses of 3 g and increased to 9 g in eight weeks. Triavil 2-25 was added. The patient improved but continued to complain of severe fatigue and depression. He found some pleasure in his employment but his fatigue and depression recurred. A six hour glucose tolerance test reveals the following: Fasting 98 mg%, 1/2 hour, 108; 1 hour 98; 2 hours 83; 3 hours 55; 4 hours 55; 5 hours 75; 6 hours 78. Treatment for the

Table 2. Results of Six-Hour Glucose Tolerance Test.

				Time Interval							Max. Drop Mg-%	Diabetic Type	Salzer Criterion	Absolute Hypoglycemic
Patient	Age	DX	F	1/2	1	2	3	4	5	6				
E.E.	23	S	95	160	212	129	102	71	95	98	24	X	X	
E.D.	34	S	95	132	84	94	83	87	96	95	12			
H.D.	35	S	95	103	90	85	80	85	90	92	15		Flat Curve	
E.D.	40	S	118	190	146	112	98	97	97	110	21		X	
H.B.	40	S	79	111	97	55	85	-	-	-	24		X	X
D.O.	32	S	76	70	76	70	78	80	80	82	6		Flat	X Curve
R.H.	49	S	102	161	177	70	80	75	-	-	32	Urine.		X 3+
T.J.	32	S	91	127	161	130	91	67	85	86	24		X	
A.L.	19	S	114	150	118	92	118	110	78	-	36		X	
M.W.	25	S	108	140	155	124	74	82	89	99	34		X	
S.O.	24	S	85	118	125	95	80	63	-	-	22	Urine Trace		
L.N.	18	5	67	108	101	97	66	72	80	77	-			
V.M.	26	5	105	157	155	112	70	86	96	95	35		X	
R.L.	40	S	70	108	100	102	60	74	80	-	-			X
J.K.	23	S	98	108	98	83	55	55	75	78	43		X	X
A.E.	22	S	93	149	78	89	78	73	87	90	20		X	
I.B.	46	S	95	151	197	125	85	65	-	-	30		X	
J.R.	22	S	96	100	88	98	90	112	106	-	-		Flat Curve	
H.G.	35	S	164	182	258	238	160	66	64	76	100	4+	X	X
A.E.	23	S	108	142	137	99	95	74	86	98	34		X	
C.F.	24	S	102	136	92	96	86	80	95	102	22		X	
U.W.	46	S	82	180	150	120	50	70	80	96	32		X	X
M.H.	18	S	83	111	57	55	63	77	76	82	28		X	X
J.C.	23	S	102	125	190	85	79	90	94	-	23		X	
K.L.	22	S	76	145	94	73	63	79	79	-	-			X
M.F.	23	S	78	140	153	110	80	70	95	87	-			X
N.M.	21	S	110	181	180	90	93	85	92	98	25		X	
H.M.	22	S	94	114	82	66	95	95	94	92	28		X	

hypoglycemia was begun with diet and daily injections of Calphosan for 8 days. Three weeks later the patient reported a decrease of both the depression and the fatigue. The HOD was repeated 8 weeks after the diet and Calphosan was started with the following results: TS-18; P-3; PA-2; D-4.

Case 3

Male, age 36, physician who suffered his first schizophrenic episode while in his senior year in medical school and has had

yearly episodes each summer since then. Each breakdown resulted in hospitalization with the usual treatments of ECT and tranquilizers. He was seen in the spring of 1966 and his motivation for coming at that time was that he hoped to avert an episode in the approaching summer. He complained of crippling depression, exhaustion and complete lack of drive. He was started on niacin, ascorbic acid and an antidepressant and made a rapid response. He had hope for the future, found employment with a pharmaceutical company and enjoyed his work. After four weeks he stopped taking the medication, broke his appointments and all contact with me. Several weeks later he was again discharged from his job, behaving irrationally and sent to a local hospital after he was arrested for beating a man on the street. He was placed on the niacin and ascorbic acid treatment and again showed a prompt response. However, he felt depressed, hopeless and fearful of making any venture into seeking medical employment or attempting medical practice. A 6 hour glucose tolerance test revealed a flat curve-F 95, H hour 103, 1 hour 90, 2 hours 85, 3 hours 80, 4 hours 85, 5 hours 90, 6 hours 92. Treatment with diet and Calphosan was begun and he felt marked improvement in 4 weeks. He felt an increased sense of well being and felt hopeful that he could avoid subsequent breakdowns. He opened an office for medical practice and began to see patients.

Summary

1) Hypoglycemia has been found to exist in an unusually high percentage of schizophrenics. Many of the 70 patients in the series could not for various reasons be tested with the 6 hour glucose tolerance test, but of the 33 submitted to the test, 28 (42.8%) were found to be positive.

2) Every patient with schizophrenia should have a 6 hour glucose tolerance test. Niacin should he discontinued one week prior to the test.

3) The hour glucose tolerance test should be interpreted as positive if there is a blood sugar drop of 20 mg.% or more below the fasting blood sugar level.

4) Treatment should consist of niacin or niacinamide and ascorbic acid and a corrective diet high in protein and fat, low in carbohydrate and free of sugar and caffeine.

5) Treatment of the hypoglycemia improves the effectiveness of the niacin therapy so that patients who show a poor initial response improve more rapidly.

6) Hypoglycemia can mimic schizophrenia.

7) Experience with these patients strongly suggests that the hypoglycemia may be an important factor in precipitating schizophrenia in an individual who is genetically predispositioned.

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