# BRIEF NOTES AND COMMENTS

# Recurrent Episodes of Diabetic Acidosis Precipitated by Emotional Stress

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The deleterious effect of emotional stress on diabetes mellitus is well known. An extreme example was observed in a patient who experienced repeated episodes of diabetic acidosis precipitated by emotional crises even though she was receiving her daily injection of insulin and exhibited no organic disease except diabetes.

## CASE REPORT

M.A., a thirty-five-year-old white female, was initially seen in the office on March 13, 1962. A diabetic since Christmas of 1960, she had been hospitalized four times for acidosis and was receiving 60 U. of Globin insulin daily. The measurement and injection of insulin were always made daily at home by her husband or father. Height was 67 in., weight 132 lbs., diet 2200 calories per day; maximum weight was 140 lbs. and minimal weight 122 lbs. Except for congenital nystagmus the physical examination revealed no abnormalities. The blood glucose was 371 mg. per 100 ml. The patient was begun on a mixture of NPH and Crystalline insulins taken together daily in the same syringe prior to breakfast.

Three weeks later, on April 2, 1962, occurred the first of five admissions for diabetic acidosis. All of the admissions were in 1962; the dates were April 2-8, April 13-27, June 22-28, July 7-22, and August 8-17. Duration of hospitalizations was from six to fifteen days, and the patient was comatose in all except the first admission. The blood glucose on admission ranged from 575 to 800 mg. per 100 ml. and the serum $CO_2$ from 1.5 to 9.8 mEq./L. Dehydration necessitated the administration of intravenous fluids, ranging from 2,000 to 6,900 ml., as well as 135 to 370 additional U. of Crystalline Insulin. Her weight decreased by the fifth admission, in August, to 109 lbs. The daily insulin administration by the father or husband was never missed, a fact verified by the patient's mother, who lived with her.

At no time did physical examination reveal other significant organic disease besides the findings of diabetic acidosis. Laboratory studies included negative urine and blood cultures, as well as normal chest X rays, intravenous urograms, cystoscopy and retrograde pyelogram, and upper gastrointestinal series.

A typical admission was from June 22 to June 28, 1962. The previous day a family argument had ensued between her husband and parents. Subsequently she "became very depressed" and felt she was "going to get sick." Nausea and vomiting followed, with markedly diminished intake of calories and fluids. By that evening, her father noted she was "breathing rapidly," "hardly responsive" to his questioning, and "restless." She was admitted at 3:00 a.m. in diabetic coma, severely dehydrated, nonresponsive, and exhibiting Kussmaul breathing. The serum acetone was 4+ in the undiluted specimen and 3+ in the 50 per cent dilution; $CO_2$ was 9.8 mEq./L., and the blood glucose 800 mg. per 100 ml. Physical examination failed to reveal any infection and the regularity of her insulin injections was again substantiated by the family. Within nine hours following the administration of 2,050 ml. of intravenous fluids and 200 units of Crystalline Insulin subcutaneously, the acetone was 2+ in the undiluted serum. Less than twenty-four hours after admission the patient was alert. There was no urinary sugar or acetone. Her usual mixture of 62 units of NPH and 16 units of Crystalline Insulin was resumed.

Several home visits were required for episodes of depression and mild acidosis which responded favorably in a few hours to two or more 25 mg. suppositories of prochlorperazine and 50 to 100 additional units of Crystalline Insulin. Between emotional upsets, glycosuria was minimal; for example, on May 2 the blood sugar was 74 mg. per 100 ml.

During the second admission in April 1962, increasing knowledge of the family situation resulted in a request for psychiatric consultation. This revealed that her first husband, who was sixteen years her senior, died seven years after their marriage, leaving her the small row house in which she presently lived. One year after developing diabetes she married a man four years her junior. He worked in the food business daily from 3:00 a.m. until 6:00 p.m. The patient worked as an office clerk daily from 9:00 a.m. to 5:00 p.m. Her parents, both in their mid-seventies, lived in her house, which contained one kitchen, one living-room, and two adjoining bedrooms. Because of this lack of privacy and the long working hours of her husband, sexual relations took place only once or twice monthly, but the patient was satisfied with her sexual life.

The patient's parents disliked her second husband and accused him of being inconsiderate and irresponsible. They claimed he married their daughter for her savings and the house from her first marriage. This resulted in frequent arguments among the members of the family although tension was denied by everybody. The patient was caught between the two factions and seemed unable to decide whether to join her husband as an independent adult or to remain the dependent child of her parents. While the patient's secondary gain from

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her illness was becoming the center of attention and obtaining everybody's sympathy yet being a burden to her parents and husband caused her to feel guilty. The unexplained diabetic comas seemed to be her way of expressing regression or running away from everything by needing hospitalization.

The first goal of psychiatric treatment was to help the patient understand the patterns discussed in the history and their detrimental effect on her physical health. However, it was apparent she needed help to take the next step of making some vital adjustments in regard to her home life and environment. The psychiatrist told the parents that they could help their daughter recover from the episodes of coma by moving into an apartment of their own, even though such a move might involve a risk to the patient inasmuch as no one would be at home to look after her all the time. The immediate reaction of the parents was anger and refusal, and they left the psychiatrist's office.

Within a week the patient returned to the hospital for the fifth time in diabetic coma. The internist then emphasized the same point that the psychiatrist had previously made to the parents, namely that the daughter was ensnared in her emotions between parents and husband, and that alleviation of her anxiety situation could not be accomplished unless the parents moved out of her house. The parents finally agreed to seek an apartment of their own and shortly thereafter, on good terms with their daughter, moved from her house.

Fifteen months have elapsed since her last discharge, with no further episodes of coma or acidosis, and she has returned to work. Her weight has increased to 149 lbs. and the diabetes is well controlled with a mixture of 56 units of Lente and 16 units of Regular Insulin. Several episodes of emotional stress have arisen during this period, but now the patient has had the insight to correct them before there is an adverse effect upon her diabetes.

# *REPORTS TO THE EDITOR*

## Symposium on Microangiopathy

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A symposium reviewing current investigation in the pathogenesis of diabetic microangiopathy was held on October 24 and 25, 1963, at the Cherry Hill Inn, Cherry Hill, New Jersey. It was sponsored by the American Diabetes Association, through its Committee on Symposia under the Chairmanship of Alexander Marble, M.D., as the second of its series of Research Symposia.

The sessions began with a review by *Johannes A. G. Rhodin, M.D. (New York University School of Medicine)* of the "Origin of the Capillaries." Of great importance for the general subject was the description of the "pericyte," a cell derived from mesenchyme which possibly may be the producer of the basement membrane material. This cell has also been called the "mural" cell or the "third" cell (Farhquar). Dr. Rhodin illustrated, by means of electron microphotographs, the development of the renal glomerulus from a simple capillary by internal branching.

*Don W. Fawcett, M.D. (Harvard University Medical School)* emphasized the varying construction of the capillaries of diverse organs, from the tight capillaries of muscle through the fenestrated capillaries of the kidney glomerulus and of the mucous membranes and the more open vessels of the liver. He stated that endothelial cell bodies probably are important vehicles of transport of materials across barriers. The differences in capillary structure must have their counterpart in difference in function and in reaction to pathologic stimuli. The liver, for example, which seems to offer no barrier to the transfer of many materials, has discontinuous capillaries, similar to the spleen. The glomerulus of the kidney and the secretory organs have fenestrated capillaries perhaps to permit readier exit of molecular substances greater in volume than mineral materials or small nonelectrolytes; while muscle and other such tight organs permit only a slower exchange of small molecules and metabolites.

*Robert G. Spiro, M.D. (Harvard University Medical School)* followed with a clear exposition of glycoproteins. He reviewed the chemistry of glycoproteins and mucopolysaccharides. He suggested that the specific structure of the carbohydrate moieties (in which sialic acid is succeeded by hexosamine, galactose, etc. in a definite sequence) may extend the genetic concept. Perhaps this sequence is not just due to a series of specific enzymes, but does involve a template, which permits such a sequential synthesis. The present genetic hypotheses do not allow the patterning of compounds other than the peptides. If only peptides are genetically determined, then all other specifically arranged materials must get there by the long arm of coincidence. Spiro suggested that intermediary metabolism of carbohydrate portions of the glycoproteins may have a relation to the basis of vascular disease (thickening of the basement membrane). The metabolic fault may be on the level of participating enzymes or on the basis of a disturbance within the "pericyte" cell, which presumably produces the glycoproteins of the basement membrane.