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Contributors

Bassler, Anthony, 1874-
Royal College of Surgeons of England

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THE TREATMENT OF DIABETES.*

BY ANTHONY BASSLER, M. D.,
New York.

A Summary of Our Present Knowledge.

The treatment of cases of diabetes mellitus is practically uniform throughout all, but the individual differences are important in the way of results. I have always considered that the dietetic and hygienic treatments comprise essentially the important phases of the therapy in this disorder. Although the physician has been reaching for medical methods of treatment, and many kinds of treatment have been vaunted only to be discarded, the fact remains that the developments in the subject of practical worth have come along dietetic and hygienic rather than drug lines. Before these are taken up, however, it would be well to remember that there are families in which there is a predisposition toward diabetes, and, sometimes in the same families, toward obesity also. These individuals possess a lowered ability to utilize carbohydrates, and thus it is well to take von Noorden's advice to restrict the carbohydrates in these families, for it is possible in that way that a number of cases of diabetes would be warded off. It may be stated as a practical fact that the more intelligent and self controlled the patient, the better is the result of the treatment of this disease. In those past middle life in whom the condition is essentially chronic (it being well known that in the young it runs a more acute course and is usually fatal in a short time), the fact that sugar is found in the urine does not possess the degree of prognostic significance to the

*Presentation of the subject at the People's Hospital Medical Board Meeting, June 11, 1912.

latter day clinicians that it did to those in the past. More than two thirds of the cases are found between the ages of fifty and sixty years in which ten to twenty years of life after the sugar has been found in the urine is very common. Further, we should not over concern ourselves or our patients that sugar is found, so long as these patients exercise a reasonable care in their diet and general mode of living. The statistics of Doctor Joslin showed that of over 350 patients treated, 180 were living, and thirty-nine (eleven per cent.) had been living over ten years, and I have a number of patients alive and well to-day after excreting sugar in their urines for years. This shows that we should never be pessimistic to the patient in the treatment of these conditions, for such a course is liable to do harm. The knowledge that one fourth of all diabetics may live ten years or more should be an incentive to optimism. I have two cases on hand, one in a woman over seventy-five years old and the other in a man over eighty years, who have had sugar in their urine for over twenty years to their knowledge, yet both are alive and comparatively well.

Important matters to be kept in mind in the care of these patients are, that syphilis, tuberculosis, and arteriosclerosis are commonly seen in them. It is well known, too, that such conditions as boils and carbuncles, spontaneous gangrene, acute pneumonia, peripheral neuritis, hemiplegia, cataract, and prevention of pregnancy are common accompaniments during the course of this disease. Diabetic coma will be dealt with later on. All of these require certain individual attentions which could not be entered into in the course of my brief remarks which I will confine more particularly to the treatment of the subject in a general way, under the following heads:

HYGIENIC.

This is very important. Daily baths assist materially in keeping the skin functions active and

diminish the liability to furunculosis as well as partially alleviating the distressing pruritus pudendi. To the thin diabetic with a dry, rough skin, a lukewarm bath followed by anointing the body with oil of sweet almonds, is a good practice. The more robust can stand a cold bath. To the very obese an occasional Turkish bath and massage is helpful. Light woolen underwear should be worn. Moderate exercises in the open should be taken, for this brings more oxygen in contact with the tissues, raises the oxydase in the body, particularly in the liver wherein it has a beneficial effect upon the diminished glycogenic function. Violent exercises should always be guarded against because they might bring on coma or apoplexy. All sources of worry and anxiety should be eliminated as much as possible, and, as I said before, an optimistic mien on the part of the physician is beneficial medicine to the patient, who should never become overanxious about his physical condition. Constipation should be carefully guarded against, because this may bring on a resorption of putrefactive toxins from the bowel, which, having a high content of ammonia, might precipitate coma. For this purpose I have found Carlsbad salts, rhubarb, and bitter cascara to be efficient. If the amount of sugar or nitrogen output is high, it is wise to put the patient to bed on a low diet for two or three weeks. In such individuals as show a loss of weight, pasty skin, and flabby tissue, the use of the tonics may be in order.

DIETETIC.

We know that the symptoms of diabetes are directly or indirectly dependent upon the hyperglycemia, the grade of which is pretty accurately indicated by the amount of glucose excreted. Up to rather recent times the treatment for diabetes was to eliminate the hyperglycemia if possible, and to do this constituents of food which are most readily converted by the digestive processes into grape

sugar, namely, the carbohydrates, were severely interdicted. This rule was a standard for many years, and in the majority of patients it answered fairly well. In recent years, it became noticeable to clinicians that certain patients upon this "standard diet" failed in health, lost strength, became edematous, etc. As a consequence, certain clinicians, after experimenting with restricting the diet still more, only to have the patients become worse, adopted the opposite process of adding some carbohydrate to the diet with marked benefit to the patient. The controversy then raged among the clinicians, the elimination carbohydrate men taking the stand that carbohydrate was contraindicated. Their position being right in the main, but wrong in the entirety of the subject, they lost ground, as time went on, to the more modern view, namely, to give carbohydrates to the tolerance of the patient. Taking cases as they occur in practice, the best plan to follow is to place them upon the following diet, which represents high protein and almost no starch or sugar substance:

PROTEIN, LOW CARBOHYDRATE DIET.

Breakfast: Coffee with one and one half ounce cream.
Two eggs cooked with half ounce butter.
One ounce bacon.

Luncheon: Two eggs.
One ounce bacon.
Two ounces lamb chops (1), ham (2), beef-steak (3), chicken (4), or fish (5), broiled with half ounce butter.
Vegetables from list with half ounce butter.
Six ounces wine or one ounce whiskey.

Afternoon tea with half ounce cream.

Dinner: Any clear soup.
One quarter pound roast pork (5), beef (4), mutton (3), turkey (2), chicken (1), or lamb (1).
Vegetables from list with half ounce butter.
Salads with half ounce oil in dressing.
One ounce cream cheese.
Six ounces wine or one ounce whiskey.
Demi tasse of coffee.
Each day select meats with same number.

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Vegetables allowed:	Asparagus.	Endive.
	Best greens.	Lettuce.
	Brussels sprouts.	Mushrooms.
	Cabbage.	Radishes.
	Cauliflower.	Rhubarb.
	Chicory.	Salsify.
	Cresses.	Spinach.
	Cucumbers.	String beans.
	Egg plant.	Tomatoes.
	Celery.	Vegetable marrow.

After a number of days, say from ten to fourteen, the urine should be examined in twenty-four hour specimens, representing at least two separate days, and comparison should be made as to the output of sugar and nitrogen with the estimation before the establishment of the diet, while the patient was still on the general one. If the output of sugar is not diminished enough, which is represented in two per cent. or less, or twenty-seven grammes daily output or less, or four grammes of ammonia nitrogen or less, this diet will answer for a continued course. Should the patient lose weight and strength, carbohydrate should be added in a certain number of grammes each day. For this purpose it is well to use simple rolls, which weigh about thirty grammes and contain fifty per cent. starch, and therefore fifteen grammes of sugar making content, for the time being, and estimations of the urine made. This giving of rolls can serve as an index to the carbohydrate tolerance of the patient, and the urine is then examined every fourth day. The quantity of rolls is then gradually increased until the point is noted that more starch substance is being taken than the patient can utilize without sugar accumulation in the blood and being represented in the urine. The number of grammes of carbohydrate substance representing the tolerance of the patient is then noted, and a selection from the subjoined list is practical and convenient. The list contains the more common articles of food in the lines mentioned and their amounts in per cent. of finished bulk of the sugar content in each of them. You can roughly figure a

100 grammes a day in this way for example, a roll that would weigh an ounce (thirty grammes) being about fifty per cent. starch (which is the same as sugar) would represent fifteen grammes of sugar content.

STARCH VALUES OF DIFFERENT FOODS.

<i>Breads, cakes, pies, etc.—</i>		<i>Vegetables—continued.</i>	
Squash pie	21.7	Turnips	8.7
Tapioca pudding	30.0	Rhubarb	8.7
Mince pie	37.2	String beans	9.4
Lemon pie	37.4	Onions	9.9
Apple pie	41.7	Squash	10.4
Corn cake	47.3	Green corn	14.1
Gluten bread	47.6	Green peas	16.1
Brown bread	50.7	Artichokes	16.7
Biscuits	52.6	Green beans	22.0
Doughnuts	52.6	Potatoes boiled	22.3
White bread	52.8	Sweet potatoes	27.1
Cream pie	54.9	Lentils	58.6
Rolls, milk, and water	54.9	Dried beans	59.1
Graham or rye bread	55.9	Lima beans	67.0
Buns	59.7		
Wheat rolls	60.4	<i>Fruits, berries, etc., fresh</i>	
Marble cake	63.9	Blackberries	5.7
Ginger bread	64.7	Strawberries	6.5
Fruit cake	64.7	Watermelon	6.5
Crackers, Boston		Muskmelon	9.3
“ cream of milk		Oranges	9.7
“ butter		Pineapples	9.7
“ graham, each	69.4	Cranberries	10.1
		Raspberries	12.6
<i>Vegetables—</i>		Apricots	13.4
Cucumbers	2.5	Pears	14.2
Celery	3.0	Apples	16.6
Spinach	3.1	Grapes	17.7
Asparagus or lettuce	3.3	Prunes	18.5
Brussels sprouts	3.7	Fresh figs	18.8
Tomatoes	3.9	Plums	20.1
Cabbage	4.9	Bananas	22.9
Egg plant	5.1	All forms of dried and canned fruits run about four times as high in sugar, bulk for bulk, as the fresh.	
Pumpkins	5.2		
Cauliflower	6.0		
Radishes	6.6		
Beets	6.7		
Carrots	7.4		

In the very severe cases where patients manufacture sugar from even proteins and fats,

we must keep them on a protein diet and perhaps use stricter diets on certain days in the week. For this purpose, "green days" and "oatmeal days" are valuable. With the employment of these diets no other foods are allowed on such days excepting those mentioned, both of which are nourishing enough to sustain the adult individual for the time being and still serve to eliminate the sugar. Alternation can be made with protein, green, and oatmeal day diets to keep the patients as well as it is possible for diets to do. The following are practical for the purpose. In the imminence of coma, green and oatmeal day diets are the safest.

OATMEAL AND GREEN DAY DIETS.

- Green days: Three eggs.
Coffee, black.
Bacon, one ounce.
Any green vegetables.
Any broth or clear soup.
Whiskey, three ounces, or Burgundy or Rhine wine, ten ounces.
- Oatmeal days: Oatmeal, eight and one half ounces, or 250 grammes.
Butter, eight and one half ounces.
Eggs, seven ounces.

The oatmeal is cooked thoroughly with water for two hours and the butter and eggs are stirred in when the oatmeal is nearly done, salt being used as desired. This consists of the food taken on the oatmeal day, and it may be served as thin gruel, mush, or fried mush. Black coffee, some of the sour wines, Burgundy, or the whiskey may also be taken in moderate amounts as above specified. If the oatmeal is ground very fine in a coffee grinder it may be mixed with baking powder and very good biscuits can be made, using the butter directly upon them. Some of the oatmeal may be eaten in this way and the rest as mush.

MEDICINAL.

Many drugs have been advanced for the medicinal treatment of these cases, but few have stood the test of experience and time. There is no disease in which quackery, in and out of the profession, is more rampant than in diabetes, and it is well to discourage all patients from using the proprietary

remedies so blatantly and ridiculously advertised. Warren, in 1812, strongly recommended the use of opium and its derivatives, and this drug still stands as the best means to diminish the thirst, appetite, amount of urine, secretion of sugar, and nervous irritability. With it, the general condition of the patient improves, and many of those who are debilitated increase in weight. There are many advocates of morphine, others of codeine sulphate, and of the crude drug. In my experience, those patients have a tolerance to opium and can take large doses without narcotism. Having used codeine sulphate for a number of years, and then morphine in gradually increasing doses, I have come to the belief that the dried extract of opium gives the best results, this being started in half grain doses, three times a day, and gradually increased until four to six grains daily are taken.

The next drug of efficiency, recently so highly recommended by Floersheimer, is arsenic. Why it is that arsenic has a selective action on improving the general condition of these patients and their tolerance of carbohydrates is still on theoretical grounds, but there is no doubt that practically there are patients who do better on arsenic than on opium, or any other medicinal treatment. In using it, Fowler's solution commencing with three minims and gradually increasing up to ten, three times daily, is the most convenient and answers for all purposes. It is well here to remember that while large doses of opium may be employed, with the use of arsenic the doses should always remain small or moderate, for cases not benefited by these doses would only be made worse by larger ones.

Throughout the treatment, the urine should be regularly tested by the iron chloride reaction for diacetic acid. If this is present in amounts noticeable by this test, an alkali is necessary to neutralize the acid content of the tissues which is a reaction of the tissues to the high sugar content in the blood, but which in itself more precipitately brings the

case to a close than the sugar. When the acid is present, the use of sodium bicarbonate taken by mouth answers the purpose. It is well to start with two or three gramme doses, three times daily, dissolved in water, and increasing this when there is danger of coma, up to as high as one or two ounces for the day. In the presence of diabetic coma, this alkali can be used by intravenous injection or proctoclysis, and many patients have been brought out of coma by it, and sometimes it is good practice to do a venesection and draw off a pint or more blood before the alkaline solution is injected.

In those cases where the stools are high in fats and contain many meat fibres (pancreatic disease), the employment of pancreatic extract has been tried. A close perusal of the literature on the results that have been brought about warrants one in believing that but little benefit can come by the use of pancreatic extract or any of the enzyme preparations supplied by manufacturing houses. Recently, however, sheep's pancreas has been used instead of the extract. A few cases treated in this way have shown remarkable results, and there is little doubt that it is a measure of treatment that has come to stay. For the purpose, the fresh pancreas is secured from the slaughter house or butcher, and this can be taken palatably by being made into a salad with a dressing, from one to three glands being taken in the course of twenty-four hours.

In closing, permit me to say that in the treatment of this disease the patient should be under constant observation, preferably by the same physician. When the patient becomes careless or indifferent, he should be told that, while he is alive and apparently well, he cannot afford to be lax about his condition. His urine should be examined at stated intervals, his general condition and diet watched, and advice given in many ways that would be helpful. In the beginning, such persons are like those who have a sword held fixedly over their heads, but too far away to strike. Slowly but surely with most

of them the hand comes closer and closer. Finally it is nearby, after which the sword descends quickly and surely. It is when the sword is coming closer, and at the time that it is nearby and before it strikes, that the physician can be most helpful to the patient, for once it starts cutting our patient down, I think we all realize how hopeless our efforts are.

126 EAST SIXTIETH STREET.