

Original Articles.

DIET REDUCTION WITH RETENTION OF PROTEIN TO RELIEVE GLYCOSURIA IN DIABETES MELLITUS.

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BECAUSE of the theories outlined below, this method of diet reduction during the beginning of hospital treatment is being used at the University Hospital for relief of glycosuria, and was used in the series of cases described in this paper.

The theories underlying the diet reduction method are as follows:

1. By keeping the protein intake of the diet at a necessary level, the tendency to a development of acidosis is decreased as the patient does not have to burn his own body fats.

2. Protein is needed to replace that lost by the wear and tear on the tissues during the metabolic changes of the body. Chittenden's standard is 0.12 grams of nitrogen per kilogram of body weight. We conclude that this amount of protein is necessary to the body during a diet reduction. This would average 40 to 50 grams daily. This amount of protein is increased in this method because of the altered metabolic changes in diabetes.

3. With the protein intake maintained at a definite level the percentage of carbohydrate in the diet would be relatively decreased. Under preparatory treatment to fasting¹ the protein and fat are both reduced, leaving the carbohydrates relatively high. This is a modified sugar tolerance test on a patient who cannot metabolize sugar properly.

By keeping the percentage of sugar low in the food intake the system might be more quickly drained of the excess sugar present in the blood stream.

4. The tolerance of the patient is more easily and quickly determined.

5. There is less complaint of hunger on the part of the patient by this method of reducing diet.

6. The protein in the diet by maintaining the serum protein in the blood, possibly aids in the nutrition and functioning of the kidney during the diet reduction².

The Method of Diet Reduction.

First step. Eliminate the fats from the diet for one or two days, at the same time maintain the proteins and carbohydrates each at 60 to 100 grams (60 grams protein in the severe cases up to 100 grams in the mild cases).

Second step. Leaving the proteins as before, halve the carbohydrates each day until the glycosuria is relieved. [Note: The carbohydrates may be reduced more gradually as indicated by the case.] If the glycosuria still persists when 10 grams of carbohydrate are reached continue at 10 grams for three days unless sugar free before. If glycosuria is still present at end of three days on 10 grams use step three.

Third step. If glycosuria is still present add 50 to 100 grams of oatmeal to the diet for two days.

Fourth step. If glycosuria persists, repeat the diet used just preceding the oatmeal days, lowering the proteins one-third. Keep the patient two days on this diet if necessary.

Fifth step. If not aglycosuric starve, giving only fat-free broths and water for a two-day period.

Sixth step. If necessary, revert to the oatmeal-diet for two days and again starve.

When building up the diet, if starvation has been used, build up the protein first to 50 or 60 grams. Then gradually increase the carbohydrates to the danger point. Lastly add fats, 5 to 10 grams a day in severe cases and 25 grams per day in mild cases. If starvation was not used, the protein is already in the diet. In this case increase the carbohydrates 5-10 grams daily to danger point. Then add in the severe cases five grams every second or third day. In mild cases increase 10 to 15 or more grams daily. When the carbohydrates reach 50 grams, if a break has not occurred before, increase fats as stated above.

CHART.

Summary of series. 15 cases. No deaths to date. 100% discharged sugar and ketone free. Incidence according to age:

Up to 10 years	1 case
10 to 20 years	1 case
20 to 35 years	6 cases
35 to 60 years	1 case
60 and over	6 cases

Incidence according to sex:

8 females	7 males
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Case NO.	Sex	Age	On Admission				On Discharge		Return Cases. Diet on Admission			
			% Sug.	Gm. Sug.	Di.	Acetone	Sug. Free	Ketone Free	Pro.	Fat.	Carbo.	Cal.
1.	F	65	0.73	5.58	0	0	yes	yes				
2.	F	64	7.7	154.	0	0	yes	yes				
3.	F	60	0	0	0	Trace	yes	yes				
4.	M.	61	0.312	5.1	0	slight Trace	yes	yes				
5.	M.	27	8.69	361.05	+	+++	Left	House				
6.	F	66	1.74	15.66	0	0	yes	yes				
7.	M.	19	3.44	36.12	0	+	yes	yes				
8.	F	46	5.72	65.18	+	++	yes	yes				
9.	M.	21	6.66	118.6	0	0	yes	yes				
10.	M.	23	4.76	135.6	Very St. Trace	+	Left	House				
11.	F	34	5.4	178.2	+	+	yes	yes				
12.	F	61	6.24	24.9	0	0	yes	yes				
13.	M.	6	0	0	0	0	yes	yes	40	35	31	600
14.	M.	33	0	0	0	0	yes	yes	70	90	60	1330
15.	F	20	0	0	0	Very slight Trace.	yes	yes	60	90	50	1250

Results obtained by the use of this method of diet reduction.

All cases showing diacetic acid in the urine when admitted to the hospital gradually become diacetic free from the first day of admission. Diacetic acid had disappeared from the urine in each case before the urine was sugar free, with the exception of Case 5, who had a very slight trace (See cases 5, 8, 10, 11). Two cases of another series under starvation treatment upon admission did not have diacetic acid in the urine. However, when fasted, diacetic appeared in both cases and did not disappear until the protein in the diet reached 55 to 70 grams. All cases showing acetone in the urine when admitted to the hospital gradually become acetone free from the beginning of the treatment with this method of diet reduction. In other words, the cases showing a tendency toward acidosis improved from the onset of the treatment. Rendering the patient sugar free

is usually one of the critical periods of the disease.

Cases coming to the hospital without ketonuria did not show ketone bodies in the urine at any time during diet reduction.

The average number of diet days required to relieve glycosuria was four days.

Two cases of this series required use of oatmeal diet days^s or step 3. One of these became aglycosuric on step 4, the other by the fifth step.

The results according to the time required to establish the tolerance:

Case 6 discharged the 12th day with a diet of 100 grams protein, 90 grams fat and 90 grams of carbohydrates, a total of 1575 calories.

Case 4 discharged the 14th day with a diet of 110, 115, and 100 grams, respectively, a total of 1875 calories.

Case 2 discharged the 13th day with a diet

Case NO.	Diet on Discharge			Blood Adm. Sug. Fat	Blood on Discharge Sug. Fat	Blood on Discharge Sug. Fat	Diet Days for urine to Become Sug. free	Notes		
	Pro. Fat	Carbo.	Cal.							
1.	60	90	90	1410	.374	.666		2.	Combined with nephritis.	
2.	100	110	100	1790	.333	.613		2.	Discharged 13th day of treatment.	
3.	70	70	90	1270	.325	.671	.181	.638	Blood Sugar Normal at 8th day	
4.	110	115	100	1875	.238	.605	.166	.614	1.	Discharged 14th day.
5.					.422	.782			10.	Refractory Patient.
6.	100	90	90	1570	.357	.708	.183	.656	1.	Discharged on 12th day of treat.
7.	90	100	85	1600	.214	.606	.080	.547	2.	
8.	65	75	45	1115	.250	.708	.122	.676	4.	
9.	100	100	90	1660	.285	.536	.140	.574	3.	
10.					2nd day .134				5	Refractory Patient.
11.	100	90	45	1390	.300	.908			8.	
12.	100	100	70	1580	.286	.566			2.	
13.	70	70	50	1110	.085	.647				"gained weight Looks better" (Mother's report)
14.	100	115	85	1780	.153	.65	.095	.632		Gained 5 pounds 1st 2 months out of Hospital.
15.	85	85	75	1405	.08	.815	.08	.790		Once broke on 40 gm. Carbo.

of 100, 110 and 100 grams respectively, a total of 1790 calories.

Case 15. During the first hospital treatment glycosuria appeared when the carbohydrate of the diet reached 40 grams. During the last admission she was sugar free during the entire course. Carbohydrate tolerance was 75 grams at the end of the last admission. Glycosuria did not appear during this admission as the patient did not wish to have the tolerance increased above 75 grams at this time.

The phlegmon on the scalp in Case 5, after persisting for two months, healed during treatment.

In Case 1 combined with nephritis there was gangrene affecting both feet. The process was arrested during treatment.

In Case 2 during the first part of the treatment the patient could not read postal cards; four weeks later she could read without difficulty and do embroidering.

Case 6 had cystitis; this was the chief complaint on entering the hospital. This was gradually relieved during the treatment of diabetes.

Case 13 has gained in weight and looks much better, according to the reports sent back to hospital by the mother.

Case 14 gained five pounds in weight the first two months on the final tolerance.

Case 2, upon admission, showed 7.7% sugar; discharged on the 13th day with a diet of 1790 calories.

The points of interest observed during this series and to be confirmed in future cases are as follows:

1. Avoid discharging a patient with a fat content in the diet over 15 grams higher than the next highest constituent of the diet.

Case 15 was discharged (from a former admission) with a diet as follows: protein, 60 grams; fat, 90 grams; and carbohydrate, 50 grams. On discharge the acetone in the urine was a single plus. The patient, on return to

the hospital, stated that at no time did she take the full amount of fat in the diet. On the present admission acetone was present in the urine as a very slight trace only. On rebuilding the diet with the fat and protein corresponding the patient left the house ketone-free.

2. Try to avoid the appearance of sugar in the urine after the patient becomes sugar free. Breaks of this kind seem to sensitize the system to sugar and to decrease the final carbohydrate tolerance.

3. Discharge the patient following the first course of hospital treatment with a diet just sufficient to meet the caloric requirements. Do not attempt at this time to push the diet to the limit; rather give the body a rest for a time and build up the diet on a future occasion.

In building up the tolerance of such a return case, endeavor to keep the carbohydrate (in each daily increase of the diet) at the same percentage that it was in the diet on the previous discharge. By taking into consideration the specific gravity of the urine and the concentration of the 24-hour specimen, an approaching glycosuria may be indicated. A gradual increase in the specific gravity during the last few days of hospital treatment is a warning that the carbohydrate content of the diet is set too high for a final tolerance.

4. Blood sugar readings are relatively higher with advancing years.

REFERENCES.

- ¹ Joslin's Treatment of Diabetes Mellitus, 1917, pp. 303, 305.
² New Series No. 34 Scientific Memoirs by Officers of Medical and Sanitary Department of the Government of India, p. 64.
³ Hamburger: British Medical Journal, March 8, 1919.

THE PATHOLOGY OF "INFLUENZAL PNEUMONIA."*

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THIS paper is based on ninety-five post-mortem examinations, eighty-two of which were performed at the Brady Laboratory of Pathology at the New Haven Hospital, which is the teaching hospital of the Yale Medical School. The other thirteen were performed at the United States General Hospital No. 16 in West Haven. All were done under the direct supervision of Dr. M. C. Winternitz, Professor of Pathology and Bacteriology at the Yale Medi-

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cal School, and it is through his kindness that I am permitted to give you this report. More complete studies, in which all the phases of the disease are taken up in detail, are now in press. As the anatomical changes in the respiratory tract are the most constant and by far the most important, they will be considered in some detail, while the more striking extra-pulmonary lesions will be touched upon briefly.

It must be stated at the start that we do not know the etiology of influenza. At present it is the general consensus of opinion that the influenza bacillus is not the primary etiological agent. Perhaps the most promising work toward solving the problem is that of various groups of French and English workers who have found a filterable virus in the blood of influenza patients. When injected into the blood stream of monkeys, the virus causes a hemorrhagic condition of the lungs. Of course, this work is yet to be verified. We are also unable to state where the initial lesion occurs, or how it manifests itself. While, undoubtedly, the first recognizable symptoms occur in the upper respiratory tract, the possibility that the disease is primarily a blood infection or that it may first attack the lung, must be kept in mind.

You are only too familiar with the intense cyanosis which was observed in the influenza patients who developed pneumonia. I believe that it was considered a very bad prognostic sign. At the post-mortem table, the face, neck, and upper chest were often literally plum color, especially in the young, robust adults who were seen so frequently in the first weeks of the epidemic. Frothy, blood-tinged fluid bubbled from the nose and mouth in nearly all the patients. Jaundice was quite frequently seen, and was probably due to an increased destruction of red blood cells and to cloudy swelling of the liver, causing obstruction of the bile capillaries. The above and an intense rigor were the most striking features on external examination of the body.

On opening the thoracic cavity, the pleural surfaces were distinctly more wet than usual, and an effusion of two or three hundred cubic centimeters of faintly blood-tinged serous fluid were found in a good percentage of the cases. Later, fibrin, in small or large amounts, was more frequently seen. Comparatively rarely