Archives of Internal Medicine

VOL. 26 DECEMBER, 1920 No. 6

THE USE OF A HIGH FAT DIET IN THE TREATMENT OF DIABETES MELLITUS*

FIRST PAPER

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The treatment of diabetes mellitus has been very greatly improved in the recent past, owing to the work of Allen [1] and his colleagues. It has been shown by him that the urine of the severest diabetics can be made sugar free by sufficiently prolonged starvation and will remain sugar free if the total energy intake is kept sufficiently small.

It has been the general custom to make up the diet largely of protein, because of the undoubted desirability of omitting carbohydrates, and because of the almost universal fear of precipitating a dangerous acidosis by allowing more than a minimum of fat. This high protein, low fat, low carbohydrate diet, given in quantities sufficient to maintain metabolic needs, is accompanied by a glycosuria in the severe diabetics. In order to prevent glycosuria, it is necessary to restrict the total energy intake so much that inanition results. In other words, this leaves the physician the choice of one of two procedures. On the one hand, he may keep the patient sugar free, but in so doing, because of the low energy intake, he renders him unfit for the ordinary activities of life. On the other hand, if he aims to avoid this incapacity for his patient, he must expect him to continue to suffer from the effects of hypergylcemia.

It is evident that the two horns of the dilemma can be avoided if the diabetic can safely be given enough calories to maintain metabolic equilibrium, without producing hyperglycemia or acidosis. Since carbohydrate cannot be used, and since protein is, as just pointed out, unsatisfactory, we have dared to ignore the belief concerning the danger of fat in the diet of diabetics, and have investigated in the clinic the effect of a diet whose energy comes largely from fat, to

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1. Allen, F. M.: Tr. A. Am. Phys. **32**:138, 1917; Am. J. M. Sc. **153**:313, 1917.

which is added sufficient protein to maintain nitrogen equilibrium and the minimal carbohydrate necessitated in making up a diet that a human being can eat over a long period of time.

For the purpose of studying this question, we have adopted a routine procedure. When a patient enters the clinic, he is placed on a diet containing from 900 to 1,000 calories, of which about 90 gm. is fat, 10 gm. is protein and 14 gm. is carbohydrate. After the patient has been sugar free for one or two weeks, his diet is increased to about 1,400 calories, of which 140 gm. is fat, 28 gm. is protein and from 15 to 20 gm. is carbohydrate. In the cases of small individuals this diet is sufficient for prolonged use, and some of them are discharged with instructions to continue it. For larger persons, after another period of trial, a second increase is made, reaching 1,800 calories, containing 170 gm. of fat, from 30 to 40 gm. of protein, and from 25 to 30 gm. carbohydrate. Further additions up to 2,500 calories may be made to suit individual cases.

In order to prove that our procedure is an improvement over the usual method, we must show, (1) that glycosuria is avoided in severe diabetics; (2), that this diet does not precipitate acidosis; (3), that nitrogen equilibrium is maintained, and (4), that the patients are able to lead at least a moderately active, comfortable life.

We have thus far had the opportunity of studying the effect of our method in the treatment of seventy-three cases of true diabetes mellitus. There has been no selection of cases—every patient entering the service has been placed on this regimen. The majority of these seventy-three cases have been of the severest type. This follows from the fact that the physicians of the state consider the University Hospital the court of last appeal, and send us those patients who do not respond to simple diabetic measures.

In spite of the fact that so many of our cases were of the severe type, we have succeeded in rendering and keeping every patient sugar free up to the time of discharge. The following case is an example of the response of a severe diabetic to our treatment.

REPORT OF CASE

CASE 1 (No. 20-426).—A woman, aged 34 years, entered the clinic June 8 with a letter from her family physician in which he stated that he had been unable to render her urine free of sugar, even though he had starved her for nearly a week. She confirmed his story and said that she was so weak that she could hardly walk.

She was immediately placed on our first high fat diet, containing 900 calories. It was not until June 25, that the last trace of sugar disappeared from her urine. The ferric chlorid test became negative June 29. July 1, her diet was increased to 1,400 calories, of which 140 gm. were fat, and July 9 it was again increased to 1,800 calories, of which 170 gm. were fat. During her last week in the hospital, she took a walk after each meal and stated that she had

practically regained her normal strength. At no time after its first disappearance did glycosuria develop. She was discharged July 15 on the diet containing 1,800 calories, of which 170 gm. were fat, 40 gm. protein and 25 gm. were carbohydrate.

In order to show that the usual high protein diet is accompanied by glycosuria in these severe diabetics, we have submitted three of our patients, previously made sugar free by means of our diet containing 90 gm. of fat and 16 gm. of protein, to such a high protein diet. Each one of these individuals became glycosuric as a result of this change to a high protein diet and was again quickly made sugar free by a return to the original diet.

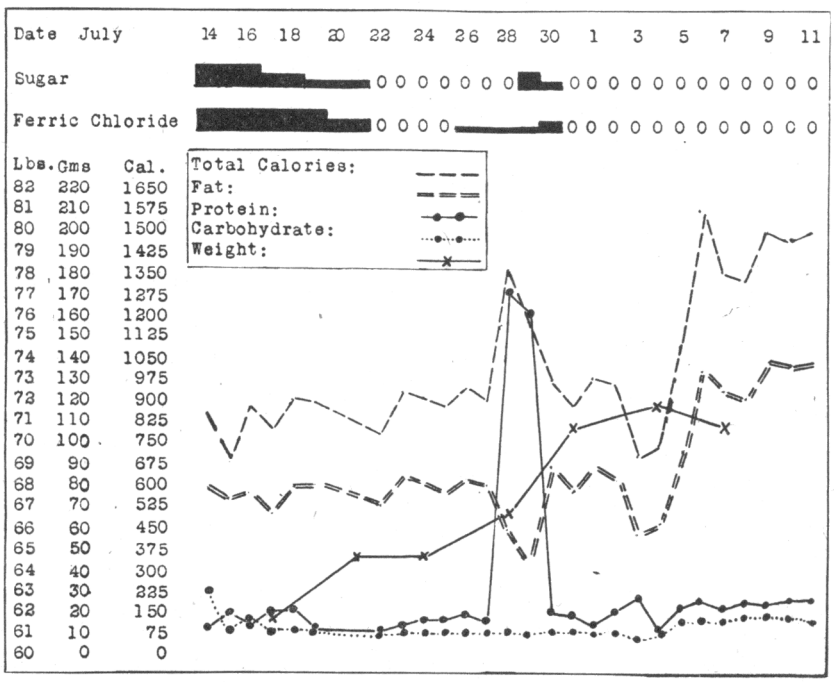

Fig. 1—Case 2 (20-475). Showing (1) disappearance of urinary sugar on high fat diet; (2) its reappearance on high protein diet; (3) its disappearance again on high fat diet and (4) its continued absence with increase of calories by addition of fat.

CASE 2 (No. 20-475).—A woman, aged 33 years, who on a low carbohydrate high protein diet, had lost 40 pounds' weight in a year, entered the clinic July 14, weighing 62 pounds. On a diet of 18 gm. protein, 80 gm. fat and 14 gm. carbohydrate, totaling 900 calories, her urine became sugar free July 21, and remained so during the following week. On each of two days, July 28 and 29, she received 170 gm. protein, 55 gm. fat and 12 gm. carbohydrate, totaling 1,200 calories. July 30 she was returned to her former diet. The urine of July 29 and 30 contained, respectively, 11 and 3 gm. glucose. The urine of July 31 was sugar free. August 5, her diet was increased to 1,400

calories, with 25 gm. protein, 140 gm. fat and 20 gm. carbohydrate. On this diet her urine has remained sugar free. The data are presented graphically in Figure 1.

CASE 3 (No. 20-461).—This patient was brought to the clinic July 2, 1920, on the verge of coma. He was confused, so weak that he could not stand, and showed the classic Kussmaul breathing. As a result of our first high fat diet (containing 90 gm. fat and 900 calories), sugar disappeared from his urine July 13. The acidosis disappeared on the same day. July 20, after having shown no sugar in his urine for a week, he was placed on a diet containing 900 calories, of which about 130 gm. were protein. His total calories were the same as on the high fat diet, and his carbohydrate intake was unchanged. His urine on the fourth and fifth day of this diet contained sugar. Clearly, the return of glycosuria in a patient previously sugar free on our high fat diet was due to the substitution of protein for fat.

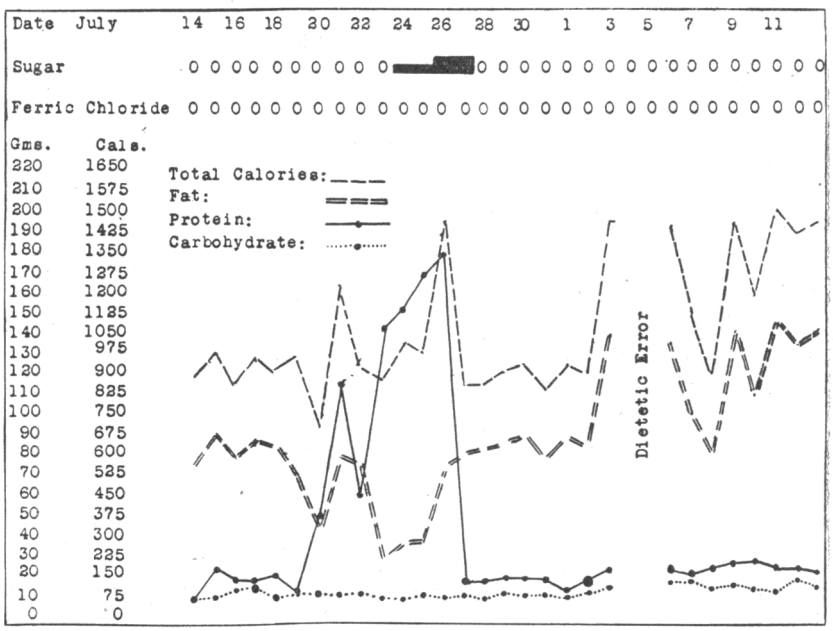

Fig. 2.—Case 3 (20-461). Showing (1) absence of urinary sugar on high fat diet; (2) its reappearance on high protein diet; (3) its disappearance on subsequent high fat diet and (4) its continued absence with increase of calories by addition of fat.

We felt it was highly desirable to feed this patient 1,500 calories in order to avoid inanition, provided, also, that this could be done without producing a return of the diabetic state. Accordingly we gave him the desired number of calories, made up in the usual way, largely of protein. The diet had the following composition: Total calories, 1,483; protein, 181 gm.; fat, 78 gm.; carbohydrate, 14 gm. His urine the next day contained 11.4 gm. sugar. Only one day of this diet was required to convince us that it was unsuitable, and he was returned to the original high fat diet. On the second day of this latter diet, his urine became sugar free, and remained so. August 1, his calories

were increased to 1,500, of which 150 gm. were fat, 30 gm. protein, and 20 gm. carbohydrate. He continued to remain sugar free, made a gain in weight (from 88 to 97 pounds) in two weeks, and was furnished slightly more than 0.66 gm. protein per kilogram of body weight. This diet, then, of 1,500 calories, containing 150 gm. fat, fulfilled our two specifications; first, that he remain sugar free, and second that he suffer no inanition. The data from August 13 to July 11, are presented graphically in Figure 2.

CASE 4 (No. 20-427).—This man had had a severe diabetes which had never been treated systematically before his entrance to the hospital June 9. After four days of our fat diet, he became sugar free. July 26, after he had been sugar free for nine days on a diet of 28 gm. protein, 130 gm. fat, and 20 gm. carbohydrate, totaling 1,400 calories, he was given the same 1,400 calories, of which 185 gm. were protein, 50 gm. were fat and 12 gm. were carbohydrate. The urine of July 29 and 30 contained 6.4 and 7.2 gm. sugar, respectively. July 30 he was returned to the original 900 calories, high fat diet, and the next day his urine was sugar free. His diet was then increased according to our usual procedure, and he was still sugar free when he left the hospital.

All three of these patients demonstrated their inability to tolerate, without glycosuria, a diabetic diet of the ordinary type containing a relatively large amount of protein. Yet they readily and promptly responded to our high fat diet with a disappearance of urinary sugar. Two diets of the same number of calories, one rich in protein and the other rich in fat, produced a glycosuria in the first case and no glycosuria in the second. These experiments, coupled with the fact that we have yet to see a patient who does not become sugar free on our regimen, justify us in believing that patients who would continue to have a glycosuria on the standard high protein diet, containing sufficient calories to prevent inanition, may be expected to become and remain sugar free on a diet of the same number of calories of which nearly all are in the fat content.

Having in mind the prevailing fear of the use of fat in the diet of diabetics we were very much surprised to find, when fat is used, as we used it in the management of our seventy-three cases, that such fear is entirely ungrounded. In no case did a serious acidosis develop. It is true that four of these seventy-three patients died in the hospital, but none of these deaths was due to our diet. One patient entered the hospital with influenzal pneumonia. Another one was transferred from the surgical clinic suffering from a severe sepsis accompanying suppurative mastoid disease. Both of these patients died within twenty-four hours after their admission to the medical service. The third patient came to the hospital in coma and died ten hours after admission. The fourth patient refused to limit herself to the diet, and went into coma after eating a bag of oranges brought by a relative. None of these fatalities can, by any stretch of the imagination, be attributed to the high fat diet. In no case did the much feared fat produce any untoward symptoms.

Not only was this true, but unexpectedly enough, acidosis, even though marked, existing at entrance, invariably cleared up under our treatment. The following cases are examples of this beneficial effect on the acidosis.

Case 3 (No. 20-461) shows how the high fat diet may be attended by the gradual diminution and final disappearance of acidosis. This patient was brought to the hospital June 30 in a semicomatose condition, with the air hunger typical of extreme acidosis. An idea of the severity of the acidosis may be obtained from noting the fact that 157 gm. of sodium bicarbonate during the seventeen hours after his admission failed to make his urine neutral. July 2, when he had recovered from his stupor sufficiently to be able to eat, he was placed on our routine diet with its 90 gm. of fat daily. July 13, eleven days later, his urine was sugar free, and on the same day the ferric chlorid test on his urine became negative.

Case 2 (No. 20-475) shows well the simultaneous disappearance of sugar and ferric chlorid reaction from the urine of a severe diabetic, as a result of our high fat diet. The data are presented in Table 1.

TABLE 1.—Relation of Diet to Disappearance of Sugar and Acetone Bodies from Urine

Date	Urinary Sugar*	Ferric Chlorid Reaction
July 14 (entrance)	++++	++++
15	15.6	+++
16	22.0	++++
17 (part specimen)	0.0	++++
18	6.9	++++
19	1.0	++++
20	4.7	+++
21	4.1	++++
22	0.0	0
23	0.0	0

* Sugar is expressed in grams per twenty-four hours. Ferric chlorid +++ means that the typical color reaction was still obtained after the urine had been diluted four times with equal volumes of water.

Case 4 (No. 20-427), a severe diabetic already described above, never showed more than a trace or "one plus" of ferric chlorid reaction in his urine.

Case 5 (No. 19-537).—The patient, a severe diabetic, 21 years old, ran the usual clinical course on our diet. The data are presented in Table 2.

The patient, who is Case 6 in this report, is being treated experimentally in the department of pediatrics, and his case is cited through the courtesy of Dr. D. M. Cowie. Because of the well known fact that diabetes in young children is especially severe and usually rapidly fatal, we consider this case of great value as evidence in support of the view that a high fat diet is not attended by dangerous acidosis.

TABLE 2.—Relation of Diet to Disappearance of Sugar and Acetone Bodies from Urine

Date, 1919	Urinary Sugar	Ferric Chlorid Test	Blood Sugar	Carbon Dioxid Tension of Alveolar Air
Nov. 23	++++	+	0.30	
24	+++	+		
25	+++	+		
26	++	+		
27	+	+	0.21	
28	++	+		
29	+	+	....	30.0
30	+	+	....	40.6
31	0	+		
Dec. 1	0	0		
2	0	0		
3	0	0	0.176	45.0
4	0	0		
5	0	0		
6	0	0		

Case 6 (No. 4923).—A boy, 7 years old, entered the hospital Oct. 15, 1919, complaining of increasing weakness and great loss of weight. The carbon dioxid tension of the alveolar air was 20 mm. mercury. The therapeutic result as regards glycosuria was not entirely satisfactory because the boy occasionally departed from his diet. The case does, however, show the inocuousness of a long continued high fat diet. The data during a period when the diet was characterized by its high fat content, are presented in Figure 3.

It is not necessary to describe more cases than these because those presented are typical and characteristic of the whole series. Even though we are repeating, we feel it necessary to point out again that none of the patients whom we treated by means of our high fat diet developed a severe acidosis. It is true, on the contrary, that the evidence of acidosis progressively decreased day by day until it had invariably become negligible.

No diet can be considered adequate in the treatment of diabetes unless it will maintain nitrogen balance. Our diet is comparatively low in protein, and is open to the possible criticism that it contains insufficient nitrogen. It has been shown by several observers, and notably by Hindhede,[2] that less than 0.66 gm. protein per kilogram of body weight, in the presence of sufficient calories from other sources, is more than enough to maintain nitrogen balance in healthy ordinarily active human beings. Our diet is constructed with this requirement in mind, and is so arranged that it contains at least 0.66 gm. protein per kilogram of body weight before the patient is discharged from the clinic.

But what is true for the normal man may not hold for the diabetic. It accordingly becomes necessary to determine the actual ratio between the nitrogen intake and nitrogen output of diabetics on our diet. This was done by the usual procedure. The intake was computed from

2. Hindhede: Skand. Arch. Physiol. **30**:97, 1913.

TABLE 3.—CASE 19-444, SHOWING THE NITROGEN METABOLISM OF A DIABETIC BEING FED A HIGH FAT LOW PROTEIN DIET *

Date	Urine Volume	Glucose Urine	Blood Sugar	Body Weight	Stool Weight	Intake					Output		
						Protein, Gm.	Fat, Gm.	Carbohydrate, Gm.	Calories	Nitrogen Intake	Nitrogen Urine	Nitrogen Stool	Nitrogen Balance
9/ 5	3,200	+++	0.52	95.0	..	16.30	97.40	9.87	1,008				
9/ 6	3,525	+++	....	....	..	16.30	97.40	9.87	1,008				
9/ 8	2,110	+++	0.36	....	..	16.30	97.40	9.87	1,008				
9/10	2,930	+++	0.29	....	..	16.30	97.40	9.87	1,008				
9/12	2,880	+++	0.24	91.0	..	16.30	97.40	9.87	1,008				
9/15	2,700	++	0.20	....	..	16.30	97.40	9.87	1,008				
9/16†	.....	.....	....	....	..	.....	.....	...	.....				
9/17	?	+++	0.42	....	..	16.30	97.40	9.87	1,008				
9/18	3,000	+++	....	....	..	16.30	97.40	9.87	1,008				
9/21	3,100	+++	0.23	87.0	..	16.30	97.40	9.87	1,008				
9/22	2,900	0	....	....	..	16.30	97.40	9.87	1,008				
9/25	2,600	0	0.15	85.5	..	16.30	97.40	9.87	1,008				
9/30	2,500	0	....	85.5	..	24.87	141.42	9.89	1,458				
10/ 1	2,500	0	....	85.0	..	24.87	141.42	9.89	1,458				
10/ 2	2,250	0	0.16	85.0	..	24.87	141.42	9.89	1,458				
10/ 3	2,750	0	....	84.0	..	24.87	141.42	9.89	1,458				
10/ 4	1,510	0	....	84.5	..	24.87	141.42	9.89	1,458				
10/ 5	2,650	0	....	86.2	..	24.87	141.42	9.89	1,458				
10/ 6	2,085	0	....	86.0	..	24.87	141.42	9.89	1,458				
10/ 7	1,200	0	0.15	86.2	99	24.87	141.42	9.89	1,458	3.019	6.714	0.940	—3.675
10/12	2,585	0	0.13	88.5	..	36.82	192.87	9.87	1,981				
10/13	2,050	0	0.15	88.5	..	36.82	192.87	9.87	1,981				
10/14	2,800	0	....	88.0	..	36.82	192.87	9.87	1,981				
10/15	1,460	0	0.18	88.0	..	36.82	192.87	9.87	1,981				
10/16	2,600	0	....	88.0	..	36.82	192.87	9.87	1,981				
10/17	1,750	0	....	87.0	92	36.82	192.87	9.87	1,981	5.891	5.375	0.929	—0.929
10/22	1,055	0	....	89.5	..	36.82	192.87	9.87	1,981				
10/23	1,115	0	....	90.0	..	36.82	192.87	9.87	1,981				
10/24	1,420	0	0.15	92.5	39	36.82	192.87	9.87	1,981	5.891	4.855	0.913	+0.123
10/26	1,430	0	....	93.5	..	36.82	166.20	9.87	1,682				
10/27	1,535	0	....	94.0	..	36.82	166.20	9.87	1,682				
10/28	1,500	0	....	94.5	..	36.82	166 20	9.87	1,682				
10/29	2,000	0	....	94.5	..	36.82	166.20	9.87	1,682				
10/30	1,708	0	....	94.5	..	36.82	166.20	9.87	1,682				
10/31	2,470	0	0.15	94.2	42	36.82	166.20	9.87	1,682	5.891	2.433	0.421	+3.037
11/ 1	2,030	0	....	94.5	..	36.82	166.20	9.87	1,682				
11/ 2	2,420	0	....	93.0	..	36.82	166.20	9.87	1,682				
11/ 3	1,700	0	....	93.0	..	36.82	166.20	9.87	1,682				
11/ 4	1,850	0	....	92.5	..	28.08	162.80	9.87	1,604				
11/ 5	2,120	0	....	92.5	..	28.08	162.80	9.87	1,604				
11/ 6	1,800	0	....	92.0	..	28.08	162.80	9.87	1,604				
11/ 7	1,920	0	0.15	91.5	35.5	28.08	162.80	9.87	1,604	5.092	2.965	0.455	+1.672
11/11	2,235	0	....	92.5	..	28.08	162.80	9.87	1,604				
11/12	2,365	0	....	92.2	..	28.08	162.80	9.87	1,604				
11/13	2,425	0	....	92.5	..	28.06	162.80	9.87	1,604				
11/14	1,950	0	....	92.0	46	28.08	162.80	9.87	1,604	4.492	1.211	1.150	+2.130

* The studies in the nitrogen metabolism of the diabetics were made by Dr. C. E. Roser, at that time a member of the medical staff of the University Hospital. His heroic labors at the time of the last influenza epidemic unfortunately resulted in his death. We who knew him realize that medicine has lost one of her most promising devotees. All his work was characterized by zeal, intelligence and rugged honesty. We take this opportunity of acknowledging our deep indebtedness to him in this investigation, and of expressing our grief occasioned by his loss.

† The patient left the hospital at this time without permission and during one day ate about 75 gm. protein, 60 gm. fat, 371 gm. carbohydrate, equal to 2,350 calories. Returned next day.

Atwater and Bryant's Food Tables, and the output in the urine and stool was quantitatively determined by the Kjeldahl method. Eight cases were completely studied in this way. We present, in Table 3, the data obtained from one of these, Case 7 (19-444).

It will be seen from this table that 25 gm. of protein daily were not sufficient to establish nitrogen balance in the short time allowed, whereas 28 gm. were more than enough. Theoretically, on the basis of 0.66 gm. protein per kilogram of body weight, this patient requires 26

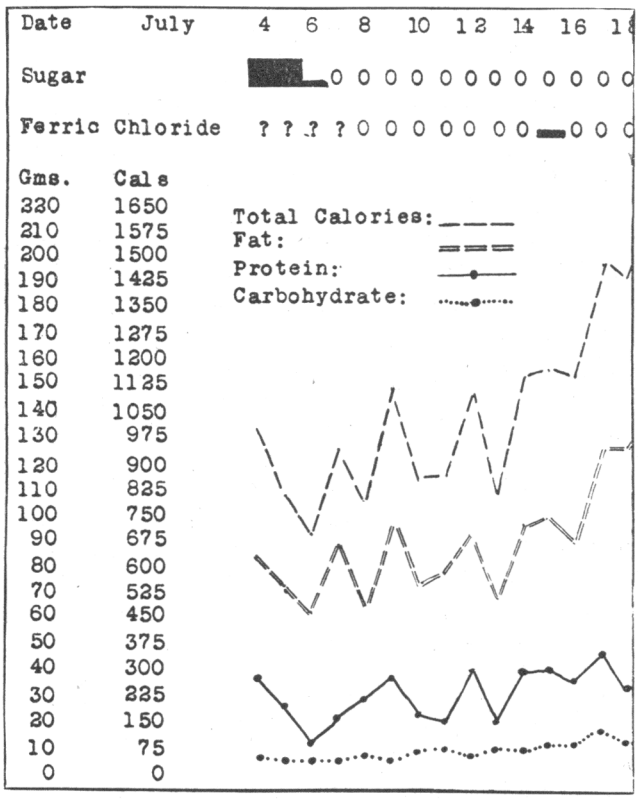

Fig. 3.—Showing absence of acidosis in a child fed a high fat, low protein diet.

gm. protein daily, computed from a weight of eighty-eight pounds. At his discharge weight, he would require 28 gm. of protein daily. But, as already pointed out, it has been shown for normal man that the "two-thirds of a gram per kilo" rule may be expected to supply more than enough nitrogen. This same relationship holds in this diabetic patient, who, when eating 0.66 gm. of protein per kilo of body weight has an excess of more than 2 gm. daily over nitrogen balance.

The other cases studied by this method showed a similar relationship between protein need and body weight, and convinced us that nitrogen balance could be safely maintained by feeding 0.66 gm. of protein per kilogram of body weight in the diabetic as in the normal man. This makes any argument on this score against our high fat, low protein diet, untenable.

A diabetic diet, in order to be satisfactory, must be capable of enabling the patient to lead a moderately active life for an indefinite period. As has already been pointed out, the severe diabetic may be kept sugar free by a sufficient reduction of his total caloric intake, but it is frequently necessary to reduce the total calories so much when protein is used as the chief source of energy that such patients suffer from slow starvation, and are quite incapable of earning a livelihood—indeed many of them may be said to merely exist. From the point of view of the patient, who does not fully appreciate the dangers of continued hyperglycemia, such a situation is a poor exchange for that which he had before treatment. While our experience with the high fat diet has been brief in relation to the chronicity of the disease and we are not in a position to discuss the eventual results of our diet, we are, nevertheless, greatly impressed by the excellent condition of our patients months after leaving the clinic. The strength and capacity for work of some of our younger patients is astonishing to one who has seen many severe diabetics treated by the older methods. We cite a few cases as examples of this point.

CASE 8 (No. 20-19).—A young man, 22 years old, entered the clinic Jan. 16, 1920, weighing 113 pounds. After five weeks of treatment he was discharged on a diet containing 2,000 calories, of which 40 gm. were protein, 25 gm. carbohydrate and the remainder fat.

Since then, he has returned at frequent intervals for examination. On every occasion he has been sugar free, and he has gained 9 pounds in weight. May 7, less than four months after he came to us, he began working in a machine shop, at a stamping machine, which keeps him on his feet constantly. August 20 when last seen by us, he stated that he was feeling entirely well, that he had had no difficulty in doing his work and that he found his diet very pleasant.

CASE 9 (No. 19-286).—A man, aged 40, who had had glycosuria for ten years before coming to us, entered the clinic because he was continuously losing weight and strength, because of increasing numbness of the feet, accompanied by prickling sensations in the legs, and because of serious and increasing impairment of vision. On admission, June 5, 1919, his blood sugar was 0.4 per cent. By June 9, as a result of our diet containing 900 calories, he was sugar free. By June 25 his diet had been increased to 2,500 calories and consisted of 243 gm. fat, 48 gm. protein, and 15 gm. carbohydrate. He was discharged June 30, 1919, with this diet, weighing 129 pounds.

March 30, 1920, nine months later, he returned for examination stating that he had felt entirely well during the interval and that he had had no difficulty in carrying on his work as a traveling salesman. He weighed 124 pounds and his urine was sugar free.

CASE 10 (No. 20-420).—A woman, aged 32 years, entered the clinic June 5, 1920, complaining of weakness of more than a year's duration. Her condition had become such that she had not been able to do her housework, and if she walked about she fainted. She was started on our routine high fat diet containing 900 calories and became sugar free in five days. Her diet was increased by the usual steps until it reached from 1,800 to 2,000 calories of which about 170 gm. were fat. She left the hospital June 15, 1920, on this diet. A month later she returned for examination stating that she had gained 3 pounds and that she was doing her housework for the first time since January, 1919. Her urine was sugar free and there was no reaction with ferric chlorid.

SUMMARY

Patients with severe diabetes, as a class, do not remain sugar free on the usual high protein diet unless the total energy intake is kept so low that incapacity from starvation results. The only satisfactory diet is one which will keep the diabetic sugar free, which will prevent the occurrence of serious acidosis, which will maintain nitrogen balance and which will make it possible for him to resume the ordinary activities of life. With these four points in mind, we studied the effect of a high fat, low protein, low carbohydrate diet in the treatment of diabetes. Our experience with this type of diet in the management of seventy-three diabetics has convinced us that it is capable of fulfilling these four specifications.

APPENDIX

Following are examples of high fat, low protein, low carbohydrate diets of varying caloric value.

DIABETIC DIET NO. 1. EXAMPLE 1

Dinner	Protein, Gm.	Fat, Gm.	Carbohyd., Gm.	Calories
Chicken, 2 oz.	12.2	1.4	....	61.6
with butter, ⅔ oz.	0.2	17.0	....	153.8
Cabbage, 2 oz.	0.9	0.18	3.18	17.8
with vinegar, salt and pepper.				
Asparagus, 3 oz.	1.53	0.18	2.8	18.9
with butter, ⅓ oz.	0.1	8.5	....	76.9
3 olives, medium size.	0.12	4.6	1.94	50.0
Broth	....	.....	....	....
Tea	....	.....	....	....
Supper				
Lettuce, 2 oz.	0.68	0.18	1.64	10.8
with mayonnaise, 1⅓ oz. (oil, 1 oz.)	....	28.35	....	255.1
Tomatoes, 4 oz.	1.02	0.18	3.4	19.2
with butter, 10 gm.	0.1	8.5	....	76.9
Broth	....	.....	....	....
Tea	....	.....	....	....
Breakfast				
Lettuce, 2 oz.	0.68	0.18	1.64	10.8
with ground bacon, 1 oz.	2.98	18.37	....	177.2
Broth	....	.....	....	....
Coffee	....	.....	....	....
Total	20.51	87.62	14.6	929.0

DIABETIC DIET No. 1. EXAMPLE 2

Dinner	Protein, Gm.	Fat, Gm.	Carbohyd., Gm.	Calories
Boiled ham, 1 oz	5.72	6.35	....	80.0
Spinach, 3 oz	1.77	0.27	2.73	20.4
with vinegar, salt and pepper.				
Asparagus, 3 oz	1.29	0.09	2.37	15.3
with butter, 20 gm	0.20	17.0	....	153.8
Tea	....	.....	....	....
Broth	....	.....	....	....
Supper				
Cabbage, 2 oz	0.9	0.18	3.18	17.8
with ground bacon, ½ oz	1.49	9.18	....	88.6
String beans, 3 oz	1.95	0.27	6.3	35.4
with French dressing.				
Oil, 1 oz	....	28.35	....	255.1
Vinegar, ½ oz., salt and pepper.				
Broth	....	.....	....	....
Tea	....	.....	....	....
Breakfast				
Bacon, ⅔ oz	2.1	13.96	....	125.0
1 egg	6.03	4.72	....	66.5
Broth	....	.....	....	....
Coffee	....	.....	....	....
Total	21.46	80.37	14.58	858.0

DIABETIC DIET No. 1. EXAMPLE 3

Dinner	Protein, Gm.	Fat, Gm.	Carbohyd., Gm.	Calories
Cottage cheese, 1 oz	5.92	0.28	1.21	31.1
Lettuce, 2 oz	0.68	0.18	1.62	10.8
with mayonnaise, 1 oz	....	20.04	....	191.4
Tomatoes, 3 oz	1.02	0.18	3.39	19.2
with butter, ⅓ oz	0.1	8.5	....	76.9
Broth	....	.....	....	....
Tea	....	.....	....	....
Supper				
Cabbage, 1½ oz	0.67	0.13	2.38	46.6
with mayonnaise, 1⅓ oz. (oil, 1 oz.)	....	28.35	....	255.1
Spinach, 4 oz	2.36	0.36	3.64	27.2
with butter, ⅓ oz	0.14	12.4	....	108.9
Broth	....	.....	....	....
Tea	....	.....	....	....
Breakfast				
1 egg	6.03	4.72	....	66.6
with butter, ⅓ oz	0.1	8.5	....	76.9
Cream, 1½ oz. (18%)	1.2	8.4	2.1	88.8
Broth	....	.....	....	....
Coffee	....	.....	....	....
Total	18.22	91.68	14.34	999.5

DIABETIC DIET NO. 1. EXAMPLE 4

Dinner	Protein, Gm.	Fat, Gm.	Carbohyd., Gm.	Calories
Steak, 2 oz	9.31	8.67	....	115.7
with butter, ⅓ oz	0.1	8.5	....	76.9
Cabbage, 2 oz	0.9	0.18	3.18	17.8
with ground bacon, 1 oz	2.98	18.37	....	177.2
Tomatoes, 3 oz	1.02	0.18	3.49	19.2
Broth	....	.....	....	....
Supper				
Lettuce, 2 oz	0.60	0.18	1.64	10.8
with mayonnaise, 1⅓ oz	....	28.35	....	255.2
Asparagus, 3 oz	1.53	0.18	....	18.9
with butter, ⅔ oz	0.2	17.0	....	153.8
Tea	....	.....	....	....
Broth	....	.....	....	....
Breakfast				
Lettuce, 2 oz	0.68	0.18	1.64	10.8
with vinegar, salt and pepper.				
½ hard cooked egg	3.01	2.36	....	33.3
Broth	....	.....	....	....
Coffee	....	.....	....	....
Total	20.41	84.15	12.75	889.6

DIABETIC DIET NO. 1. EXAMPLE 5

Dinner	Protein, Gm.	Fat, Gm.	Carbohyd., Gm.	Calories
Boiled ham, 1½ oz. (medium fat)	8.41	8.35	....	113.2
Asparagus salad:				
Lettuce, 1 oz	0.34	0.09	0.82	5.4
Asparagus, 3 oz	1.53	0.18	2.8	18.9
Mayonnaise, 1⅓ oz. (oil, 1 oz.)	....	28.35	....	255.2
String beans, 2½ oz	1.6	0.22	5.2	29.5
with butter, ½ oz	0.14	12.04	....	108.9
Broth	....	.....	....	....
Tea	....	.....	....	....
Supper				
Tomatoes, 3 oz	1.02	0.18	3.39	19.2
Lettuce, 1 oz	0.34	0.09	0.82	5.4
with mayonnaise, ⅔ oz. (oil, ½ oz.)	....	14.2	....	127.6
Broth	....	.....	....	....
Tea	....	.....	....	....
Breakfast				
Omelet: 1 egg	6.03	4.72	....	66.6
Butter, ⅓ oz	0.1	8.5	....	16.9
Cream, 1 oz. (18%), for coffee	0.8	5.6	1.4	59.2
Broth	....	.....	....	....
Total	20.31	83.02	14.43	886.2

DIABETIC DIET NO. 2. EXAMPLE 1

Dinner	Protein, Gm.	Fat, Gm.	Carbohyd., Gm.	Calories
Chicken, 2 oz	12.2	1.42	....	61.6
with butter, 1 oz	0.28	24.09	....	217.9
Beets, 3 oz	1.35	0.09	8.25	39.3
with butter, ½ oz	0.14	12.04	....	108.9
String beans, 3 oz	1.95	0.27	6.3	35.4
with ground bacon, ½ oz	1.49	9.18	....	88.6
Broth	.....	.....	....	.....
Tea	.....	.....	....	.....
Supper				
Lettuce salad:				
Shredder lettuce, 2 oz	0.68	0.18	1.64	10.8
Chopped onion, ½ oz	0.22	0.04	1.4	6.9
Mayonnaise, 2 oz. (oil, 1½ oz.)	.....	42.53	....	82.6
Tomato bisque:				
Tomatoes, 1 oz	0.34	0.06	1.13	6.4
1 bouillon cube	.....	.....	....	.....
Cream, (40%), 2 oz	1.24	22.68	1.7	215.8
Hot water to fill bowl	.....	.....	....	.....
Tea	.....	.....	....	.....
Breakfast				
Bacon, 1 oz	2.98	18.37	....	115.7
Egg, 1	6.03	4.72	....	66.6
Cream (18%), 1 oz., for coffee	0.8	5.6	1.4	59.2
Broth	.....	.....	....	.....
Total	29.70	141.27	21.82	1,415.7

DIABETIC DIET NO. 2. EXAMPLE 2

Dinner	Protein, Gm.	Fat, Gm.	Carbohyd., Gm.	Calories
Fish, 1⅔ oz	8.41	4.86	....	52.5
with butter, ½ oz	0.15	12.75	....	115.4
Cabbage, 2 oz	0.90	0.18	3.18	17.8
with cream (18%), 1 oz	0.80	5.60	1.4	59.2
Tomatoes, 3 oz	1.02	0.18	3.39	19.2
with butter, ½ oz	0.15	12.75	....	115.4
Broth	.....	.....	....	.....
Tea	.....	.....	....	.....
Supper				
Asparagus, 3 oz	1.29	0.09	....	15.5
with mayonnaise, 2 oz. (oil, 1⅔ oz.)	.....	42.53	....	382.6
Lettuce, ⅔ oz	0.68	0.17	....	10.8
with bacon, ½ oz	1.49	9.18	....	86.6
Custard:				
Cream (18%), 2 oz	1.60	11.2	2.8	118.4
2 egg yolks	2.71	9.98	....	109.0
Tea	.....	.....	....	.....
Broth	.....	.....	....	.....
Breakfast				
1 egg	6.03	4.72	....	66.6
Spinach, 3 oz	1.77	0.27	2.73	20.4
with butter, ½ oz	0.15	12.75	....	115.4
Cream (18%), 2 oz., for coffee	1.60	11.2	2.8	118.4
Broth	.....	.....	....	.....
Total	28.75	138.42	20.31	1,423.0

DIABETIC DIET No. 3. EXAMPLE 1

Dinner	Protein, Gm.	Fat, Gm.	Carbohyd., Gm.	Calories
Trout, 2 oz	10.26	5.84	....	93.6
butter, ½ oz	0.14	12.04	....	108.9
Asparagus salad:				
Lettuce, 1 oz	0.34	0.09	0.82	5.4
Asparagus, 3 oz	1.29	0.09	2.37	15.33
Mayonnaise, 2 oz	.....	42.53	....	382.6
Celery, 3 oz	0.93	0.09	....	15.6
Watermelon, 3 oz	0.33	0.18	5.07	25.8
Tea	.....	.....	....	.....
Broth	.....	.....	....	.....
Supper				
Tomatoes, 4 oz	1.36	1.24	4.52	25.6
with butter, ½ oz	0.14	12.04	....	108.9
Egg salad:				
Shredded lettuce, 2 oz	0.68	1.18	1.84	10.8
1 hard cooked egg	6.03	4.72	....	66.6
Mayonnaise, 2 oz. (oil, 1½ oz.)	.....	42.53	....	382.6
Diabetic jello	1.36	.....	4.1	21.8
with whipped cream, 2 oz	1.24	22.68	1.7	215.8
Broth	.....	.....	....	.....
Tea	.....	.....	....	.....
Breakfast				
Omelet, 1 egg	6.03	4.72	....	66.6
1 egg yolk	2.7	5.0	....	54.5
Butter, ½ oz	0.14	12.4	....	108.9
Cream (18%), 2 oz., for coffee	1.6	11.2	2.8	118.4
Broth	.....	.....	....	.....
Total	34.22	176.21	26.24	1,827.7

DIABETIC DIET No. 3. EXAMPLE 2

Dinner	Gm. Protein,	Gm. Fat,	Gm. Carbohyd.,	Calories
Chicken, 2 oz	12.2	1.42	....	61.6
creamed with egg	6.03	4.72	....	66.6
18% cream, 2 oz	1.6	11.2	2.8	118.4
Beets, 3 oz	1.35	0.09	8.25	39.3
with butter, ½ oz	0.14	12.04	....	109.8
String beans, 3 oz	1.95	0.27	6.2	34.5
with ground bacon, ½ oz	1.49	9.18	....	88.6
Walnuts, ½ oz	2.61	9.13	1.84	100.0
Broth	.....	.....	....	.....
Tea	.....	.....	....	.....
Supper				
Cabbage salad:				
Lettuce, ½ oz	0.17	0.04	0.41	2.7
Cabbage, 1½ oz	0.67	0.13	2.38	13.3
Onion, 1½ oz	0.22	0.04	1.4	6.9
Mayonnaise, 2 oz. (oil, 1½ oz.)	.....	42.53	....	382.6
Celery, 1 oz	0.3	0.04	0.92	5.2
Tomato bisque:				
Tomatoes, 2 oz	0.68	0.12	2.26	12.8
Cream (40%), 2 oz	1.24	22.68	1.7	215.8
Hot water to fill bowl.				
Tea	.....	.....	....	.....
Breakfast				
Bacon, 1 oz	2.98	18.37	....	177.2
Lettuce, 2 oz	0.68	0.18	1.64	10.8
with mayonnaise, 2 oz	.....	42.53	....	382.6
Broth	.....	.....	....	.....
Coffee	.....	.....	....	.....
Total	34.31	174.71	29.8	1,826.6

DIABETIC DIET NO. 3. EXAMPLE 3

Dinner	Gm. Protein,	Gm. Fat,	Gm. Carbohyd.,	Calories
Trout, 2 oz	10.26	5.84	....	46.8
with butter, 1 oz	0.28	24.09	....	217.9
Green onions, 1 oz	0.45	0.09	2.8	13.8
Sliced tomatoes, 4 oz	1.36	0.24	4.52	25.6
with mayonnaise, 2 oz. (oil, 1½ oz.)	.....	42.53	....	382.6
String beans, 3 oz	1.95	0.27	6.2	35.4
with ground bacon, ½ oz	1.49	9.18	....	88.6
Broth	.....	.....	....	.....
Tea	.....	.....	....	.....
Supper				
Spinach, 3 oz	1.77	0.27	2.73	20.4
with butter, ½ oz	0.14	12.04	....	108.9
Cabbage, 2 oz	0.9	0.18	3.18	17.8
with vinegar, salt and pepper.				
Diabetic custard:				
Cream (18%), 3 oz	2.4	16.8	4.2	177.6
Egg yolks, 2	4.7	0.9	....	109.0
Broth	.....	.....	....	.....
Tea	.....	.....	....	.....
Breakfast				
Bacon, ⅔ oz	1.98	12.24	....	118.1
1 egg	6.03	4.72	....	66.6
Butter, 1 oz	0.28	24.09	....	217.9
Cream (18%), 1 oz	0.8	5.6	1.4	59.2
Broth	.....	.....	....	.....
Total	34.78	167.10	25.03	1,706.2

DIABETIC DIET NO. 3. EXAMPLE 4

Dinner	Protein, Gm.	Fat, Gm.	Carbohyd., Gm.	Calories
Boiled ham, 2 oz. (medium fat)	6.93	16.5	....	176.2
Tomato salad:				
Lettuce, 1 oz	0.34	0.09	0.82	5.4
Tomatoes, 3 oz	1.02	0.18	3.39	19.2
Mayonnaise, 2 oz. (oil, 1⅓ oz.)	.....	42.53	....	382.6
Onions, 3 oz	1.35	0.27	8.4	41.4
with butter, ½ oz	0.14	12.04	....	108.9
Celery, 1 oz	0.31	0.03	0.93	5.2
Coffee	.....	.....	....	.....
Tea	.....	.....	....	.....
Supper				
Asparagus, 4 oz	1.72	0.12	3.16	20.4
with butter, 1 oz	0.28	24.09	....	217.9
Spinach, 4 oz	2.86	0.36	3.04	27.2
with bacon, 1 oz	1.49	9.18	....	88.6
Diabetic junket:				
Milk, 5 oz	2.82	3.39	4.23	58.8
with whipped cream (1⅓ oz.)	0.83	15.12	1.15	143.8
Broth	.....	.....	....	.....
Tea	.....	.....	....	.....
Breakfast				
Spanish eggs:				
Butter, 1 oz	0.28	24.09	....	217.9
Chopped onion, ½ oz	0.22	0.04	1.4	6.9
Tomatoes, 1 oz	0.34	0.06	1.13	6.4
Eggs, 2	12.06	5.44	....	133.2
Cream (18%), 1 oz., for coffee	0.8	5.6	1.4	59.2
Broth	.....	.....	....	.....
Total	33.29	159.13	29.63	1,719.2