A COMBINATION BETWEEN DIABETES MELLITUS AND IDIOPATHIC HYPERLIPEMIA

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Despite the fact that fat metabolism disturbances in diabetes mellitus are known a long time since, the relationship between diabetes and hyperlipemia has been emphasized only in the past several decades.

The presence of hyperlipemia in diabetes mellitus has been reported as early as 1799 by Mariet, Traill (1823), Lecanu (1903) (cited ref. 15). The first publication on eruptive xanthoma in diabetes mellitus was made by Addison and Gull (1851) (ref. 15). Thereafter a great number of diabetes mellitus cases have been described with eruptive xanthoma, hyperlipemia and hypercholesterolemia.

On the other hand, it is known that in essential hyperlipemia in adults, disturbances are present in the carbohydrate metabolism as well (15).

In 1955 Adlersberg and Wang made a description of five patients with idiopathic hyperlipemia, slight diabetes and severe vascular lesions (ref. 11 and 13). According to Christensen, Døllerup and Jensen up to 1958 the total number of cases reported with idiopathic hyperlipemia amounts to 126. In one fifth of them, disturbances are noted in the carbohydrate metabolism and merely in 16 — diabetic metabolic disorders. The same authors report a female patient with essential hyperlipemia, diabetes, severe atherosclerosis with occlusion of the lower limb vessels and heavy neuropathy. They lay emphasis on the fact that diabetes mellitus is encountered very often in the families of patients with essential hyperlipemia (4).

In 1961 Bierman and Hamlin (ref. 11) reported carbohydrate induced hyperglyceridemia in 5 patients with diabetes mellitus.

Actually, we have under observation at the Naval Hospital in Varna a patient with diabetes mellitus and essential hyperlipemia.

Case report

H. D. R., 41-years-old, male, profession — driver. History of illness No 2680 27. XI. 1964. Since nine years he suffers from diabetes. Blood sugar — about 400 mg%. Treatment with sulfonylureic preparations accounted for its lowering to 240—280 mg%. He feels well and is with preserved working capacity, in spite of losing 15 kg of his weight. Periodically, however, his general condition is deteriorated. Four years ago enlargement of the liver was established as well as hemorrhages and degenerative alterations involving the retina. Temporary treatment carried out with insulin. Lately, he has complaints of frequent foruncles and eye inflammation. Since 1—2
years his vision has been substantially weakened, his hands grew numb, with paresthesia, his hair and teeth dropped off.

On 21 July, 1964 because of worsening of the diabetes, accompanied by occurrence of pain and feeling of burden in the right subcostal region with bilateral iridocyclitis, he was admitted at the Transport Hospital in the city of Varna. There the following findings were made: bilateral iridocyclitis, diabetic retinopathy, liver — painful and enlarged up to one fingerbreadth beneath the costal arch, and on the dorsum of the wrist — typical for eruptive xanthoma rash. Treatment with 4 gr tolbutamid brought about a maintaining of blood sugar within the limits of about 300 mg%, and glucosuria about 150 gr daily. Westergreen 70/95 mm, Weltmann 7 test-tubes, McLagan 98 photometric units, Burstein 68 Ph. U. At the same time the laboratory personnel is impressed by the milky appearance of the serum. During investigation it is found that the amount of total fats in the blood serum is 7780 mg%, and that of the cholesterol — 667 mg%. Treatment was initiated with 65 U insulin under whose effect the xanthomatic rash subsided, the content of total fats in the blood serum fell down to 2730 mg%, the blood sugar however, remaining unaltered. Subjectively, the patient felt quite well. He gained 6 kg of weight. On 27 November he was transferred for further treatment to the Internal department of the Naval Hospital, where moderate xanthochromia of the skin is discovered. Rashes as well as enlargement of the liver are not established. Pronounced polyneuropathia diabetic a. Evidence for renal disturbance and more particularly for intercapillary glomerulosclerosis (arteriolar nephrosis) is not found. The heart within the normal limits. Pulmonary emphysema. X-ray control reveals thickened and elongated aorta. RR 105/75 mm Hg, Weltmann — 8 test-tubes, McLagan — 96 Ph. U. Blood sugar about 280 mg% and average loss with urine amounting to 40—60 gr sugar per 24 hours. Total fats 2730 mg%, total plasma cholesterol 643 mg%, Esterified cholesterol 425 mg%, phospholipids 280 mg%, β-lipoproteins 180 Ph. U. Total protein 9.79 gr%, albumins 40%, globulins: α₁ 13%, β 18%, γ 23%. Chlorides 720 mg%, K 23 mg%, Na 376 mg%. In the Naval Hospital the quantity of fats in the diet is reduced to 40 gr daily, and the insulin dosage is increased up to 140 U. Diuresis falls to 2 l. and glucosuria fluctuates between 60 and 40 gr, occasionally reaching lower figures as well. Nevertheless, blood sugar is not reduced, whereas the quantity of total fats fluctuates between 4000 and 5260 mg%. Maintaining the same diet, treatment was resorted to with insulin 100 U daily in combination with 100 mg heparin. Under the effect of heparin, the blood serum is considerably clarified. Total fats fall to 2300 mg%, cholesterol — to 488 mg% and β-lipoproteins — to 158 Ph.U. (table 1).

On 13 January the patient falls ill with viral hepatitis. Jaundice occurs, plasma bilirubin is raised up to 4 mg%, urobilinogen appears in the urine. For the first time acetone is detected in the urine. He is transferred to the Infectious Hospital, where treatment is continued with a diet poor in fats (carbohydrates 200 gr, proteins 80 gr and fats 30 gr) and insulin — 100 U daily.

Following recovery from hepatitis, the patient is readmitted for treatment in the Naval Hospital on 20 February, 1965 with blood sugar 304 mg%, glucosuria nearly 50 gr per 24 hours, total fats 2620 mg%, cholesterol
The effect of diet and treatment on blood sugar, glucosuria and lipemia in the patient H. R. D.

<table>
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<th>Cholesterol</th>
<th>Total fats</th>
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<td></td>
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300 mg% (table 1). Total protein 9.13 gr%, albumins 25%, \( \alpha_1 6\% \), \( \alpha_2 7\% \), \( \beta_{16}\% \), \( \gamma_{46}\% \).

Treatment was resorted to with a diet scanty in fats and 200 U insulin daily allowance. The blood sugar fell to 200 mg%, but total fats remained unchanged in the beginning, and subsequently commenced a gradual, secondary elevation despite the low level of blood sugar.

Doubtlessly, in this case it concerns a poorly controlled diabetes with heavy vascular complications — diabetic retinopathy and neuropathy. Initially, the hyperlipemia was assumed as complication of diabetes and correspondingly, the xanthomatic rash — as xanthoma diabeticorum. It was admitted that tolbutamid treatment greatly contributed to the hyperlipemia development. It is known from literature data, disputed by some authors (7), that in treatment with sulfonylureinic preparations, development of hyperlipemia could be observed in young diabetics which subsides following insulin treatment (13). In our case, treatment with 140 U insulin daily substantially lowered the glucosuria with exerting essential effect on the hyperlipemia, independently of the fact that xanthomatic rash disappeared. A considerable falling of lipids and clearing up of the serum (table 1) was achieved only after resorting to heparin application. The development of hepatits largely deteriorated the condition of carbohydrate
metabolism, manifested by occurrence in the urine of acetone. The state of
fat metabolism, however, was not unfavourably influenced by the hep­
itis. On the contrary, it seems that hepatitis prolonged and intensified
the effect of heparin. After recovery from hepatitis, regardless of diabetes
controlling and lowering blood sugar to 180—200 mg %, the total fats and
cholesterol initiated a secondary increase. The favourable effect of heparin
alone on hyperlipemia, as well as its maintaining at a high level subsequent
to hepatitis curing, notwithstanding the controlling of diabetes, justifies
the assumption that in this instance we are not concerned with a secondary
hyperlipemia and poorly treated diabetes (9), but with a combination of
diabetes with idiopathic hyperlipemia.

As already pointed out, disturbances in the lipid metabolism frequently
accompany diabetes (1, 2, 3, 13, 15). Bradley, Eceles and Freelender (ref. 9)
lay emphasis even on the fact, that hyperlipemia could be possibly accepted
as an early manifestation of diabetes mellitus. There is a general agreement,
however, that hyperlipemia in diabetes is not strong; it is transitory in dia­
betic coma or permanent with mild forms of diabetes and is influenced by
insulin treatment (3, 5, 12, 13, 14). Christensen and assoc. (4) also stress
that in diabetes there are two types of hyperlipemia: 1) transitory increase
of lipids in ketosis; 2) hypercholesterolemia with increase of phospholipids
and total fats in slight forms of diabetes without ketosis. Unlike the latter
form, in the combination of diabetes with idiopathic hyperlipemia a consi­
derable increase of triglycerides is noted. The same is also emphasized by
Aldersberg and Eister (3). Eggstein (6) even admits that in all cases of
diabetic xanthomatosis virtually a combination of diabetes with essential
hyperlipemia is concerned. According to Hamwi and assoc. (6), all cases
of diabetes with disorders in fat metabolism, not showing improvement
consequent on appropriate treatment, represent a combination of diabetes
with essential hyperlipemia. With our patient it is very difficult to accept
the contrary, namely, that it concerns an essential hyperlipemia with se­
condary disturbance of the carbohydrate metabolism, as in this case, be­
sides the picture of heavy diabetes, the typical for the latter, vascular com­
plications in the retina and peripheric nerves are also observed.

Our patient insofar clinical picture, course of disease and effect of tre­
ment are concerned reminds of the patient reported by Christensen and
assoc. (4), who suffered from diabetes, associated with essential hyperli­
pemia. Here the insulin treatment accounts for disappearance of the xan­
thomas; clearing out of the serum, however, is achieved consequent on the
heparin effect.

In our case, similarly, the typical for diabetes deviations in the pro­
teinogram are not marked (increase of alpha 2-globulins, which according
to Christensen and assoc. (4) is not encountered in essential hyperlipemia).
As a final evidence for the concomitant course of diabetes mellitus and
essential hyperlipemia the fact is pointed out of the variable effect of
viral hepatitis upon carbohydrate and fat metabolism in our case. Hepa­
titis deteriorated the carbohydrate metabolism by significantly influencing
the fat metabolism and even considerably improving it. Carlson and Olhagen
(16) have observed substantial improvement in the fat metabolism with
reference to decreasing of blood lipids in a patient with essential hyperli­
pemia during the course of viral hepatitis disease. Notwithstanding that in
A Combination Between Diabetes Mellitus and Idiopathic Hyperlipemia

Combinations of diabetes with essential hyperlipemia it should be generally anticipated that the diabetes provokes and enhances the manifestations of essential hyperlipemia and vice versa, in our case a similar interrelationship couldn’t be established during the viral hepatitis illness. On the contrary, despite the rather severe deterioration of diabetes with occurrence of acidosis, the lipemia as well as choles terolemia substantially decreased and blood serum was almost completely cleared out. It is quite possible that both conditions have absolutely independent course of development.

REFERENCES


САХАРНЫЙ ДИАБЕТ В КОМБИНАЦИИ С ИДИОПАТИЧЕСКОЙ ГИПЕРЛИПЕМИЕЙ

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РЕЗЮМЕ

Описывается случай сахарного диабета, протекающего с тяжелыми сосудистыми изменениями — диабетической ретинопатией и невропатией в сочетании с идиопатической гиперлипемией. При заболевании вирусным гепатитом несмотря на ухудшение углеводного обмена о развитием ацидоза, наступает значительное улучшение состояния жирового обмена с понижением общих жиров и холестерина крови.