Sialic acid, possible marker of angiopathic complications at diabetics type 2

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Abstract
Studies from the last decade emphasize the importance of sialic acid (SA) in general pathology (neoplastic disease, colagenosis), and its implication in appearance and aggravation of atherosclerosis (e.g. appearance of angioopathy like chronic complication in diabetics mellitus). Diabetes is known as a major risk factor for atherosclerosis and has a high incidence in general population. The incidence of diabetes increases from year to year, especially type II of diabetes, the most common type (more than 90% from diabetics are type II). Diabetes mellitus with its chronic degenerative complications like micro and macrovascular angioopathy (coronary disease, nephropathy, retinopathy, arteriopathy) represents a major health and social problem (more than 80% of the mortality to type II diabetics is the result of coronarian and cerebral vascular complications). The early discovery of chronic angioopathic complications to diabetics is a major objective in increasing the hope of life to diabetics. Determination and monitorization of SA could be useful in the early discovering of chronic degenerative complications to patients with diabetes mellitus.

Keywords: sialic acid, angiopathic complications, type 2 diabetes.

Introduction
The total serum sialic acid (N-acetylneuraminic acid) concentration has been shown recently to be a strong predictor of cardiovascular mortality in general population.

Type 2 diabetes mellitus accounts for over 90% of cases of clinical diabetes. The clinical features of type 2 diabetes can be quite insidious; moreover if the degree of hyperglycemia is insufficient to produce symptoms. The diagnosis could be made only after the development of vascular or neuropathic complications.

Patients with non-insulin-dependent diabetes mellitus are a group with a markedly increased frequency of coronary heart disease, stroke, and peripheral vascular disease compared with non-diabetic subjects.

Because death from cerebrovascular and coronary heart disease is about two to four times as high in diabetic patients as in non diabetic subjects, there is a strong case for examining serum sialic levels in people with diabetes and comparing these with concentrations in normal subjects [1–10].

Aim of the study
Determination of sialic acid to type II diabetics comparative to non-diabetics and making correlations between the seric levels of SA and the appearance of chronic angiopathic complications.

Material and methods
The study was done on fifty type 2 diabetics and twenty non-diabetics, hospitalized in Clinical Emergency Hospital from Oradea, during the years 2002–2004. The diabetic patients were aged between 45 and 74 years, with a medium age of 59.5. The medium evolution period of diabetes was 14.8 years.

Results and discussions
From the 50 diabetic patients, 33 had increased values of SA, comparative to the witness group, where only two patients had SA values over normal limit (Figures 1 and 2).

Angiopathic chronic degenerative complications occurred in the following number of cases (Figure 3):
▪ Chronic ischaemic cardiopathy – 31 diabetic patients, 62% (Figure 4).
▪ Diabetic retinopathy – 21 diabetic patients, 42% (Figure 5).
▪ Diabetic nephropathy – 18 diabetic patients, 36% (Figure 6).
▪ Peripheral arteriopathy – 11 diabetic patients, 22% (Figure 7).

Sialic acid presented increased seric values to 27 from the diabetics with coronarian disease (87%), 13 from the ones with diabetic retinopathy (62%), 11 from diabetics with nephropathy (61%) and eight from the patients with peripheral arteriopathy (72.72%).

Arterial hypertension was present at 22 diabetics (44%), 14 (63.63%) with elevated SA levels (Figure 8).

Obesity was noticed at 39 diabetics (78%), 23 from them, being with elevated SA levels (59%) (Figure 9).
Dyslipidemia (hypertriglyceridemia, hypercholesterolemia) occurred to 31 diabetics (62%), SA being increased at 21 of them (67.7%) (Figure 10).

Seventeen diabetics were chronic smokers (34%), 15 with elevated SA (88%), specifying that 14 of them presented ischaemic cardiopathy or peripheral arteriopathy.

Conclusions

Sialic acid (SA) was significantly more elevated at diabetics, comparative to non-diabetics.

Most part of diabetics with angiyopathic complications presented elevated SA levels, especially the ones with coronarian disease.

Diabetic patients with associated proatherosclerotic risk factors presented SA elevated levels as well.

These results are in concordance with a lot of studies referring to the association of elevated seric SA levels with the presence of chronic micro and macroangyopathic complications to diabetics.

Studies on larger groups of patients are necessary to be done in order to correlate the SA with its role as a marker of angiyopathic complications to diabetics.

References


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Figure 1 – Diabetics

Figure 2 – Non-diabetics

Figure 3 – Angiopathic complications

Figure 4 – Diabetics with ischaemic cardiopathy

Figure 5 – Diabetics with retinopathy

Figure 6 – Diabetics with nephropathy

Figure 7 – Diabetics with arteriopathy

Figure 8 – Diabetics with arterial hypertension

Figure 9 – Diabetics with obesity

Figure 10 – Diabetics with dyslipidemia