Study of Adiponectin Level in Diabetic Adolescent Girls in Relation to Glycemic Control and Complication of Diabetes

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OBJECTIVE

to study the relation between adiponectin level with glycemic control and complication of diabetes.
We are aiming to determine the influence of adolescent girls with type 1 DM on circulating levels of adiponectin and to study the relation between adiponectin level with glycemic control and complication of diabetes.

METHODS

It is a cross-sectional observational study done after obtaining approval from the ethical committee of the National Research Centre, Cairo, Egypt. It conforms to the provisions of the Declaration of Helsinki (as revised in Edinburgh 2000).

The study included 40 female adolescents with type 1 diabetes mellitus attending the Pediatric Endocrinology Out-patient Clinic, National Research Center, Cairo, Egypt. Another group of 40 age matched healthy female adolescents with no obvious medical disorders and not receiving any medication were enrolled as a control group.
Inclusion criteria is type 1 diabetic females on insulin therapy with age between 9-18 years. Exclusion criteria is adolescent girls with other chronic diseases.

Methods:
All included cases were subjected to full medical history taking.
Assessment of anthropometric data, blood pressure. Clinical examination including; chest, cardiac, abdomen and neurological examination were done for all patients. .
All patients and controls underwent the following tests: lipid profile, Assessment of glycosylated hemoglobin % (HbA1 %) and reviewing two previous readings to calculate the mean value of HbA1 % in the last year prior to the study. Reviewing the records of urinary albumin execretion in an early morning fasting urine sample was determined as urinary albumin-to-creatinine ratio.

Table 1: Comparison between demographic and laboratory data of patients and control group

	Patients group (n= 40)		Control group (n= 40)		Independent t-test	
	Mean	SD	Mean	SD	t	p-value
Age (yrs)	12.44	2.48	12.39	2.14	0.096	0.922
Weight(Kg)	46.85	12.35	44.04	12.77	-1.001	0.320
Height (cm)	146.78	15.66	142.41	14.16	-1.307	0.195
BMI (kg/m^2)	21.60	3.98	21.33	3.71	-0.313	0.755
SBP (mmHg)	114.25	7.47	111.75	7.12	-1.532	0.130
DBP (mmHg)	74.25	5.94	71.75	6.36	-1.816	0.043
Triglycerides (mg/dl)	97.38	18.25	86.65	13.52	-2.987	0.004
Total cholesterol (mg/dl)	148.35	30.43	125.28	21.48	-3.918	0.0001
LDL cholesterol (mg/dl)	100.38	22.21	82.98	16.42	-3.983	0.0001
HDL cholesterol (mg/dl)	47.48	14.69	42.92	13.06	-1.464	0.147
CRP (µg/mL)	2.25	1.08	2.20	0.88	-0.227	0.821
Adiponectin (µg/mL)	14.63	2.20	8.11	1.50	-15.468	0.0001

BMI : Body mass index, SBP: systolic blood pressure, DBP: Diastolic blood pressure, LDL: low density lipoprotein. HDL: high density lipoprotein, CRP: C-reactive protein

Table 2: Comparison between demographic and laboratory data of our patients regarding diabetic complications

	Patients without diabetic complications N = 29		Patients with diabetic complications N =11		Independent t-test	
	Mean	SD	Mean	SD	t	P-value
Age (yrs)	14.09	2.71	14.86	2.17	-0.977	0.335
Weight(Kg)	49.91	14.10	43.11	8.80	1.779	0.041
Height (cm)	145.14	17.48	148.78	13.32	-0.727	0.472
BMI (kg/m^2)	23.33	3.70	19.47	3.28	3.450	0.001
SBP (mmHg)	115.00	7.40	113.33	7.67	0.697	0.490
DBP (mmHg)	75.00	5.98	73.33	5.94	0.880	0.384
Disease duration (yrs)	8.93	2.48	11.53	2.65	-3.195	0.003
Insulin dose (U/Kg/day)	1.26	0.41	1.58	0.62	-1.998	0.043
Triglycerides (mg/dl)	96.77	17.36	98.11	19.77	-0.228	0.821
Total cholesterol (mg/dl)	137.64	29.34	157.00	28.51	2.241	0.031
LDL cholesterol (mg/dl)	105.45	23.63	94.17	19.19	1.633	0.111
HDL cholesterol (mg/dl)	52.18	14.57	41.72	13.00	2.369	0.023
CRP (µg/mL)	2.09	0.87	2.47	1.33	-1.078	0.288
HbA1 (%)	9.42	1.55	12.19	2.79	-3.978	0.0001
Albumin/ creatinine ratio (mg/ gm creatinine)	18.68	5.81	130.72	104.71	-5.024	0.0001
Adiponectin (µg/mL)	13.49	1.91	16.02	1.70	-4.369	0.0001

BMI : Body mass index, SBP: systolic blood pressure, DBP: Diastolic blood pressure, LDL: low density lipoprotein. HDL: high density lipoprotein, CRP: C-reactive protein

Table 3: Comparison between demographic and laboratory data of our patients regarding microalbuminuria

	Patients with Normo-albuminuria (n=29)		Patients with microalbuminuria (n=ll)		Indenendent t-test	
	Mean	SD	Mean	SD	t	p-value
Age (years)	14.41	2.56	14.50	2.38	-0.097	0.923
Weight (Kg)	49.12	13.11	40.86	7.72	1.955	0.058
Height (cm)	146.48	17.09	147.55	11.75	-0.189	0.851
BMI (kg/m^2)	22.72	4.00	18.64	1.94	3.224	0.003
SBP (mmHg)	111.17	6.88	115.82	8.74	1.278	0.209
DBP (mmHg)	75.17	5.75	81.82	6.03	1.627	0.012
Disease duration (yrs)	9.21	2.69	12.45	1.68	-3.720	0.001
Insulin dose (U/Kg/day)	1.33	0.43	1.59	0.73	1.430	0.161
Triglycerides (mg/dl)	98.07	18.97	95.55	16.93	0.386	0.701
Total cholesterol (mg/dl)	150.03	29.38	143.91	34.12	0.563	0.576
LDL cholesterol (mg/dl)	101.55	22.32	97.27	22.70	0.539	0.593
HDL cholesterol (mg/dl)	47.79	15.03	46.64	14.44	0.220	0.827
CRP (µg/mL)	2.24	1.06	2.27	1.19	-0.081	0.936
HbA1 (%)	10.59	2.54	10.87	2.79	-0.303	0.764
Albumin/ creatinine ratio (mg/ gm creatinine)	19.00	6.23	201.18	67.52	-14.679	0.0001
Adiponectin (µg/mL)	13.85	2.05	16.69	0.78	-4.444	0.0001

BMI : Body mass index, SBP: systolic blood pressure, DBP: Diastolic blood pressure, LDL: low density lipoprotein. HDL: high density lipoprotein, CRP: C-reactive protein

Table 4: Comparison between demographic and laboratory data of our patients regarding diabetic retinopathy

	patients Without retinopathy (n=29)		patients With retinopathy (n=ll)		Independent t-test	
	Mean	SD	Mean	SD	t	p-value
Age (years)	14.10	2.69	15.32	1.59	-1.401	0.169
Weight(Kg)	48.26	13.38	43.14	8.52	1.177	0.247
Height (cm)	146.59	16.83	147.27	12.76	-0.122	0.903
BMI (kg/m^2)	22.20	3.94	19.99	3.79	1.600	0.118
SBP (mmHg)	113.79	8.20	115.45	5.22	-0.623	0.537
DBP (mmHg)	74.48	6.32	73.64	5.05	0.398	0.693
Disease duration (yrs)	9.62	2.69	11.36	2.98	-1.779	0.043
Insulin dose (U/Kg/day)	1.23	0.39	1.86	0.59	3.900	0.0001
Triglycerides (mg/dl)	99.28	17.89	92.36	19.10	1.072	0.291
Total cholesterol (mg/dl)	152.28	31.70	138.00	25.21	1.338	0.189
LDL cholesterol (mg/dl)	101.79	23.32	96.64	19.51	0.651	0.519
HDL cholesterol (mg/dl)	50.48	15.11	39.55	10.36	2.204	0.034
CRP (µg/mL)	1.93	0.84	3.09	1.22	-3.424	0.072
HbA1 (%)	9.57	1.99	13.57	1.43	-6.093	0.0001
Albumin/ creatinine ratio (mg/ gm creatinine)	49.69	77.97	120.27	100.70	-2.358	0.024
Adiponectin (µg/mL)	14.01	2.20	16.26	1.16	-3.204	0.003

BMI : Body mass index, SBP: systolic blood pressure, DBP: Diastolic blood pressure, LDL: low density lipoprotein. HDL: high density lipoprotein, CRP: C-reactive protein

RESULTS

Diabetic patients had a significantly higher diastolic blood pressure, triglyceride, total cholesterol, LDL and adiponectin than controls. Patients with diabetes complication had a significant lower BMI and HDL. On the other hand, they had higher disease duration, total cholesterol, HbA1, albumin / creatinine ratio and adiponectin. Patients with microalbuminuria had a lower BMI, higher disease duration, diastolic blood pressure and adiponectin. Patients with diabetic retinopathy had higher disease duration, insulin dose, HbA1, microalbuminuria and adiponectin. Adiponectin in diabetic patients had a significant negative correlation with BMI and positive correlation with systolic blood pressure and microlabuminuria. ***Conclusion:*** serum adiponectin level is high in adolescent type 1 diabetic girls. It can be used as a predictor of diabetes complications rather than a sensitive biochemical marker for glycemic control.

CONCLUSIONS

We conclude that serum adiponectin level is high in adolescent type 1 diabetic girls. It can be used as a predictor of diabetic complications rather than a sensitive biochemical marker for glycemic control.

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