

THE OXIDATIVE STRESS IN TYPE 1 DIABETES PEOPLE WITH CONTINUOUS SUBCUTANEOUS INSULIN INFUSION VERSUS MULTIPLE DAILY INJECTIONS TREATMENT.

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Aims

To measure oxidative stress markers in patients with type 1 diabetes (T1DM), type 2 diabetes (T2DM) and healthy subjects and to compare these markers in patients with T1DM according to insulin treatment (multiple daily injections –MDI- vs. continuous subcutaneous insulin infusion –CSII-) and the presence of diabetes related complications.

Materials & methods

Cross-sectional study that included 203 subjects with similar age and sex: 121 with T1DM (64 on MDI and 57 on CSII), 39 with T2DM and 43 healthy subjects. Study variables in patients with T1DM: insulin treatment, diabetes related complications, diabetes duration, anthropometric measures, metabolic data. Total antioxidant capacity (TAC) (Cayman ELISA, ABTS method) and oxidized LDL (ELISA kit) were measured in blood samples in all study subjects.

Results

Table 1. Baseline characteristics of study population

	T1DM (n= 121)	T2DM (n= 39)	Healthy subjects (n=43)	p
Age (years)	35.6±10.1	40.4±7.7	36.7±10.6	ns
Gender (Men/Women) %	48.7/51.3	48.7/51.3	42.9/57.1	ns
Body mass index (kg/m²)	24.7±4.4	27.3±3.4	24.8±3.2	ns

Table 3. Comparison between both groups of T1DM patients

	T1DM (n=118)	MDI (n= 64)	ISCI (n= 54)	p
Age (years)	35.6±10	34.1±10	37.5±9.9	ns
Gender (Men/Women) (%)	48.7/51.3	55.4/44.6	40.7/59.3	ns
Years with diabetes	20.16±10	17.3±9.9	23.6±10	0.02
Body mass index (kg/m²)	24.7±4	24.8±5.1	24.6±3.9	ns
Autoanalysis / day	4.3±1.8	3.5±1.7	5.2±1.5	0.000
Mild hypoglycaemia / week	3.6±2.2	3.2±2.1	4±2.3	ns
Severe hypoglycaemia /6 m	0.2±0.5	0.20±0.4	0.21±0.6	ns
HbA1c (%)	7.7±0.9	8.0±0.9	7.3±0.7	0.000
Complications (%)	25.4	20	31.5	ns
Diabetic retinopathy (%)	23.5	16.4	31.5	ns
Incipient nephropathy (%)	8.8	11.1	7.4	ns
Neuropathy (%)	1.7	1.56	1.88	ns
Hypertension (%)	17.9	12.5	24.5	ns
Smoking (%)	24.8	25.42	24.07	ns

Table 2. Oxidative stress of study population

	T1DM (n=121)	T2DM (n=39)	Healthy subjects (n=43)	p
TAC (mM)	1.4±0.67	2.6±1.2	2.8±1.3	<0.05
Oxidized LDL*	30.16±7	52±15	46±14.8	ns

Table 4. Oxidative stress in complicated and uncomplicated diabetic patients

	Diabetes 1 related complications (n=34)	Non-Diabetes 1 related complications (n=85)	p
CAT (mM)	1.2±0.6	1.5±0.6	0.05
Oxidied LDL*	31.5±9.7	29.7±7.3	ns

Table 5. Oxidative stress of smoking and non-smoking diabetic patients

	Smoking (24.8%)	Non smoking (75.2%)	p
CAT (mM)	1.4±0.7	1.4±0.6	ns
Oxidized LDL*	29.6±5.7	30.8±8.8	ns

Table 6. Oxidative stress of T1DM

	MDI (n=64)	CSII (n=57)	p
CAT (mM)	1.5±0.5	1.3±0.7	ns
Oxidized LDL*	28.8±1.5	31.6±6.8	ns

Conclusions

Subjects with T1DM had lower TAC levels than those with T2DM and healthy controls. In subjects with T1DM and any diabetes related complications TAC values were decreased with no significant differences between smokers and non-smokers. According to the use of CSII or MDI we did not find significant differences in TAC values as well as in oxidized LDL\* values adjusted to LDL levels. Further studies are needed to confirm these findings.

