AMINO ACIDS PLASMA PROFILE IN CHILDREN WITH TYPE 1 DIABETES

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Osasunbidea

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BACKGROUND

Insulin deficiency inhibits protein synthesis and stimulates protein degradation, and then amino acids metabolism could be altered in diabetes mellitus.

OBJECTIVE

The aim of this study is to analyze amino acid plasma profile in a group of children with type 1 diabetes, and to evaluate its potential application as markers of metabolic control of the disease.

SUBJECTS/METHODS

A clinical assessment and metabolic study (amino acid plasma concentrations) was accomplished in a group of 49 children diagnosed with type 1 diabetes, aged 8.6 to 14.3 years, and a group of 48 healthy children (control group), aged 7.4 to 14.8 years.

RESULTS

Plasma concentrations of amino acids (nmol/ml) in the diabetic and control groups

Amino acids	Diabetic group	Control group	p-values
ALA	144.83±36.32	134.84±36.67	n.s.
ARG	49.01±16.78	22.62±6.94	<0.01
ASP CYS	0,33±0.95	1.34±2,18	n.s.
GLN GLU	34.77±11.61	31.56±10.90	n.s.
GLY HIS	243.23±59.42	187.84±56.83	<0.01
ILE LEU	18.28±9.69	20.70±10.22	n.s.
LYS	46.53±22.3	35.34±10.23	n.s.
MET	133.62±43.59	147.09±53.89	n.s.
PHE	90.83±19.37	66.54±15.27	<0.001
SER THR	74.74±17.37	68.65±14.65	n.s.
TYR VAL	60,70±27.32	57.15±28.61	n.s.
TAU	31.57±10.68	29.18±13.05	n.s.
	81.84±19.54	65.64±16.45	<0.01
	53.93±26.03	66.04±22.04	n.s.
	73.26±27.90	57.90±18.07	<0.05
	60.25±27.18	38.25±12.47	<0.05
	190.46±48.01	148.91±35.31	<0.01
	99.69±36.82	75.66±37.01	<0.05

Clinical and biochemical characteristics of the diabetic and control groups

Items	Diabetic group	Control group	p-values
Age (years)	11.82±1.78	12.05±1.93	n.s.
BMI Z-score	0.05±0.67	-0.01±0.55	n.s.
Evolution (years)	5.79±2.67	---	---
Insulin (UI/kg/d)	0.82±0.26	---	---
Glucose (mg(dl)	198.8±55.5	89.57±10.2	<0.01
Hb1Ac (%)	7.7±1.68	4.56±0.7	<0.05

Plasma concentrations of amino acids (nmol/ml) in the diabetic and control groups

Amino acid groups	Diabetic group	Control group	p-values
Total	1383.70±353.67	1198.46±261.16	<0.05
Branched-chain	347.65±58.76	285.20±45.20	<0.01
Glucogenic	1252.74±236.82	1053.69±211.19	<0.001
Ketogenic	441.62±57.09	354.13±53.45	<0.05

Plasma concentrations of ARG, GLN, ILE, PHE, THR, TYR, VAL and TAU were significantly higher ($p<0.05$) within the diabetic group with respect to the control group.

The plasma levels of total amino acids as well as branched-chain, glucogenic and ketogenic amino acids were significantly higher ($p< 0.05$) in the diabetic group with respect to the control group.

There was no correlation between the single amino acids (or amino acid groups) plasma concentrations and the evolution of the disease (years) or Hb1Ac.

CONCLUSIONS

The study of the amino acid plasma profile in diabetic patients might be of interest since if we consider that these disturbances in proteins and/or amino acid metabolism were secondary to the insulinopenia that characterizes these patients, in a sense it would be reflecting the degree of metabolic control of the disease.