

AN IMPAIRED LIPID PROFILE IS A SIGN OF REDUCED INSULIN SENSITIVITY IN CHILDREN AND ADOLESCENTS AT TYPE 1 DIABETES ONSET



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Background & Objectives

At type 1 diabetes (T1D) onset, international guidelines recommend a starting subcutaneous insulin dose widely ranging from 0,5 to 1 u/kg/day.

Many factors such as age, pubertal stage and the severity of ketoacidosis may influence insulin sensitivity. However, it is a common experience that many subjects may require a higher insulin daily dose than expected, with the subsequent need of longer time to achieve stable blood glucose values and the extension of days of hospitalization.

The aim of this study was to find possible predictive factors related to insulin total daily dose at T1D onset

Methods

This is a retrospective study of 95 consecutive subjects at the onset of T1D, occurred between April 2014 and March 2018. Clinical and laboratory data were analyzed. Insulin requirement (IR) was expressed as the maximum amount of insulin administered subcutaneously during hospitalization per kg of body weight in 24 hours

Results

Insulin requirement (IR) was strongly correlated to lipid assessment, in particular to triglyceridemia ($p = 0.0001$). Though, as already reported, the severity of ketoacidosis and HbA1c value at onset negatively affected insulin sensibility (all $p < 0,015$), at multiple regression the significant variable was triglyceremia.

Parameters analyzed	All subjects	Subjects IR >1	Subjects IR ≤1	p value
Mean age (yrs)	8,7 ± 4,4	7,9±4,6	9,2±4,1	<0,01
HbA1c (mmol/mol)	103 ± 27	109,1±29,0	99,1±24,1	<0,01
First blood glucose value (mg/dl)	481 ± 295	614,1±407,0	411±163,5	NS
Fructosamine	604 ± 166	656,7±143,8	570,8±157,1	<0,01
Total Cholesterol (mg/dl)	188,8 ± 55,6	204,2±58,1	177,3±53,4	<0,01
HDL cholesterol (mg/dl)	45,5 ± 15,3	41,1±17,3	47,1±13,8	<0,01
Triglycerides (mg/dl)	225,7 ± 242,0	340,8±206,4	160,6±176,9	<0,0001
Symptoms duration (days)	38 ± 49	45,5±41,1	39,4±32	NS
Hospitalization duration (days)	9,4 ± 3,4	10,3±4,0	8,8±2,5	<0,0013
Intravenous Hydration duration (hours)	18,0 ± 25,3	21,1±33,5	16,4±20,4	NS
pH	7,3 ± 0,1	7,23±0,16	7,31±0,11	<0,01
HCO ₃ (mmol/L)	18,8 ± 7,6	16,2±8,6	20,2±7,0	NS

	Subjects TGL >150 mg/dl At T1D onset	Subjects TGL ≤150 mg/dl At T1D onset	p value
Mean age(years)	8.3±5.1	9.3±3.8	-
DKA (%)	60%	22.2%	<0.001
Severe DKA (%)	17%	5.5%	<0.001
Total Cholesterol (mg/dl)	214.6±56.7	163.7±41.9	<0.001
IR (U/Kg/die)	1.13±0.4	0.78±0.3	<0.001

Conclusions

Plasma triglyceridemia at the diagnosis of T1D is suggestive of increased insulin requirement, regardless of the severity of the acidosis. This could potentially reduce the time to reach stable blood glucose values, to improve glycemic control and decrease the days and costs of hospitalization. .

