The differences in insulin doses and the risk of hypoglycemia in 2 distinct days in the Romania diabetes futsal team

Authors: D.T. Cosma[1]; C.A. Silaghi[2,3]; H. Silaghi[3,4]; I.A. Veresiu[1,3]

Coordinator: I.A. Veresiu

[1] Diabetes, Nutrition and Metabolic diseases Clinical Center, Cluj-Napoca
[2] Endocrinology Clinic
[3] "Iuliu Hatieganu" University of Medecine and Pharmacy, Cluj-Napoca
[4] V[th] Department of Surgery

BACKGROUND

- in type 1 diabetic athletes, the blood glucose (BG) response to physical activity (PA) varies, being influenced by many factors, such as: the type of exercise, the insulin dose administered, the insulin absorption, etc;
- besides interindividual variability, the BG response can be fully or partially reproducible in the same subject;
- avoiding exercise induced-hypoglycemia is one of the most important strategies in order to improve the performance during PA.

AIMS

- to evaluate the demographic and clinical characteristics of the s population;
- to assess the risk of hypoglycemia, the insulin and BG variabilit different days (with and without physical activity);

MATERIALS AND METHODS

INCLUSION CRITERIA

- age > 18 years old;
- type 1 or type 2 diabetes mellitus (DM);
- members of the Romania diabetes futsal team (DiaRomania);
- $A1_c \leq 9.5\%$;
- no other chronic diseases or severe complication of DM in time of enrollment.

METHODS

- observational study;
- the assessment → self-monitoring diary with at least 7 BG measurements (including at least one during the night) and the insulin doses administered;

STATISTICAL ANALYSIS

- Microsoft Excel 2007 and SPSS 17.0
- Pearson coefficient → to establish the correlations between the insulin dose respectively the average BG levels;
- Relative risk (RR), attributable risk (A odds ratio (OD) → to compare the ris hypoglycemia between the 2 different

RESULTS

	No. subjects	Percentage (%)
Backgrounds		
Urban	8	88.88
Countryside	1	11.11
Age (years)		
20 – 29	5	55.55
30 – 39	4	44.44
BMI (kg/m²)		
18.5 – 24.9	6	66.66
25 – 29.9	3	33.33
Family history (DM)		
Type 1	3	33.33
Type 2	4	44.44
Age of DM (years)		
5 – 10	5	55.55
11 – 20	3	33.33
21 - 30	1	11.11

Table no. 1: General characteristics of the players

	No. subjects	Percentage (%)
Prandial insulin		
Aspart	4	44.44
Glulisine	3	33.33
Lispro	2	22.22
Complication due to IT		
lipohypertrophy	4	44.44
Microvascular complications		
Mild nonproliferative retinopathy	2	22.22
Stage Ib polyneuropathy	3	33.33
Other medication		
Benfotiamine	4	44.44
α-lipoic acid	2	22.22
Last A_{1c} level (%)		
6.5 – 7.5	6	66.66
7.6 – 8.5	1	11.11
8.6 – 9.5	2	22.22

Table no. 2: Clinical characteristics of the players

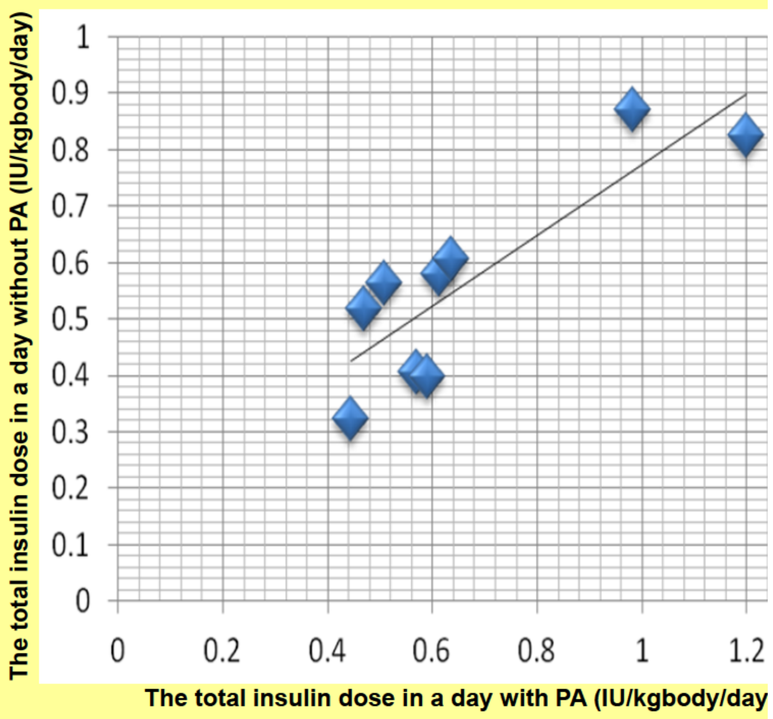

Fig. no. 5: The correlation between the total insulin doses bet 2 distinct days

	no PA	with PA	p value	p statistically significant	Pearson coef.
average BG (mg/dl)	135.41	147.16	0.198	< 0.01	0.473
average BG min (mg/dl)	72	59.33	0.476	< 0.01	-0.274
average BG max (mg/dl)	228	272.77	0.767	< 0.01	-0.115
average total ins. dose (IU/kgbody/day)	0.667	0.565	0.003	< 0.01	0.859
average basal ins. dose (IU/kgbody/day)	0.287	0.269	0.012	< 0.05	0.784
average prandial ins. dose (IU/kgbody/day)	0.38	0.296	0.002	< 0.01	0.884
average basal ins. dose (%)	43	47.6	0.030	< 0.05	0.717
prandial average ins. dose (%)	57	52.4	0.030	< 0.05	0.717

Table no. 3: The correlations between the insulin doses and respectively BG variations between the 2 distinct days

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for 1 (with PA/no PA)	4.375	.564	33.949
For cohort 2 =with hypoglycemia	1.750	.779	3.932
For cohort 2 =no hypoglycemia	.400	.103	1.550
N of Valid Cases	18		

Table no. 4: Hypoglycemia risk assessment using OR and RR

CONCLUSIONS:

- The physical activity it's an important risk factor for hypoglycemia in type 1 diabetic athletes.
- Although the differences in insulin doses between the 2 days were statistically significant, an increased hypoglycemia was noted, proving the inappropriate reduction in insulin doses and/or carbs intake prior, d after exercise.
- Individualized strategies are needed in order to avoid hypoglycemia and to increase the athlete's perfo