GLYCEMIC VARIABILITY AND SUBCLINICAL INFLAMMATION IN TYPE 2 DIABETES: EXPERIENCE IN A PORTUGUESE CENTRE IN THE LAST DECADE

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INTRODUCTION

Subclinical inflammation is a possible underlying mechanism of target organ damage in type 2 diabetes (T2D). Traditional cardiovascular risk factor control along with an adequate and stable glycemic profile, being associated with a milder inflammation status, have a beneficial microvascular impact.

OBJECTIVES

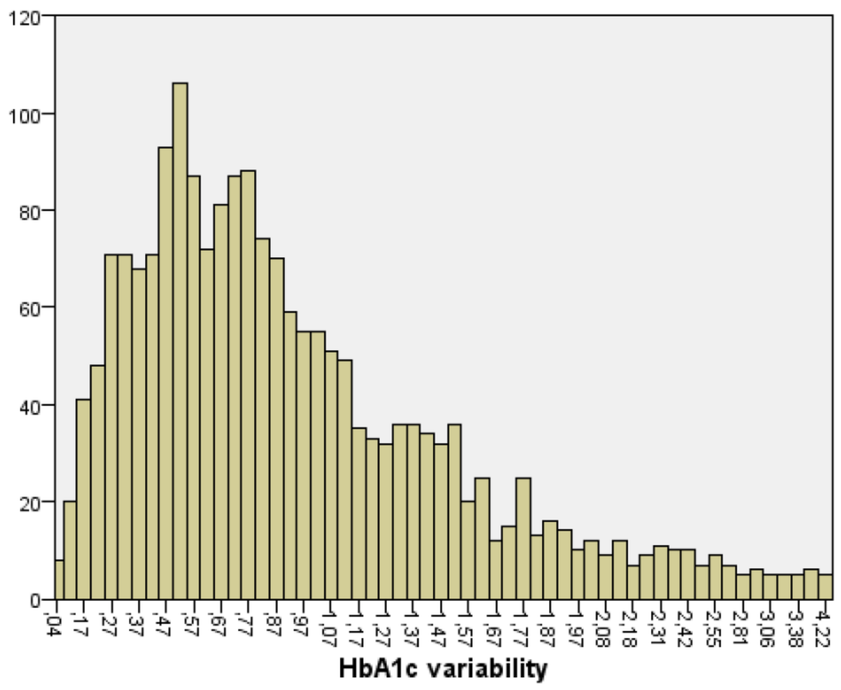
To analyze the correlation between glycemic control adequacy and stability with systemic inflammatory markers, renal disease progression and cardiovascular risk factors.

METHODS

Retrospective observational study of T2D patients (n=1989) with a minimum of 2 year follow up in the Endocrinology department of Hospital de Egas Moniz from the year 2005 until 2014. Patients younger than 18 years of age and/or suffering from secondary diabetes were excluded. Fasting blood glucose and glycated hemoglobin (HbA1c) variation were analyzed and correlated with blood pressure (BP) control, renal function, systemic inflammatory and blood lipid profile markers. Glycemic variability values were obtained from calculating the median of the annual fasting glucose/HbA1c standard deviation during the follow up period. Descriptive statistical methods were employed: t-test student, ANOVA for continuous and chi-square for categorical variables.

RESULTS

Population	
Age (years)	61,2
Female gender	58,9%
Years of T2D	11,5 +- 7,79
Follow up	7,43 +- 4,41
Number of observations	12,5 +- 8,1
Arterial hypertension	77,7%
Hypercholesterolemia	87,2%
Chronic Kidney Disease	30%
Obesity	29,4%
Coronary artery disease	7,1%
Cerebrovascular disease	3,1%
Median A1c	7,42%
Median A1c variability	0,78%
Median Glucose variability	36mg/dL



Correlations	Mean HbA1c	Fasting glucose variability	HbA1c variability
BMI (kg/m2)	NS	0,011	0,03
Total Cholesterol (mg/dL)	<0,001	<0,001	<0,001
Triglycerides (mg/dL)	<0,001	<0,001	<0,001
LDL-Cholesterol (mg/dL)	<0,001	0,015	<0,001
HDL-Cholesterol (mg/dL)	NS	NS	<0,001
Albuminuria (mg/g)	<0,001	<0,001	<0,001
Creatinine (mg/dL)	NS	<0,001	<0,001
Glomerular filtration rate	NS	0,01	NS
C-Reactive Protein(mg/dL)	0,016	0,04	0,062
ESR (mm/h)	<0,001	<0,001	<0,001
White blood cell count (x10^9)	<0,001	0,046	0,017

HbA1c variability	<1%	≥1%	*p-value*
BMI (kg/m2)	33,7 ± 10,3	32,3 ± 10,2	0,056
Years of T2D	11,2	14,4	<0,001
A1c (%)	7,09 ± 1,1	8,35 ± 1,2	<0,001
Systolic BP (mmHg)	144,5 ± 19	144 ± 16	NS
Total Cholesterol (mg/dL)	183 ± 30	190 ± 37	<0,001
Triglycerides (mg/dL)	139 ± 65	172 ± 130	<0,001
LDL-Cholesterol (mg/dL)	105 ± 25	110 ± 31	<0,001
HDL-Cholesterol (mg/dL)	49 ± 22	46 ± 12	<0,001
Albuminuria (mg/g)	80,6mg/g	183mg/g	<0,001
Creatinine (mg/dL)	0,96 ± 0,2	1,02 ± 0,4	<0,001
GFR (CKD-EPI – mL/min/1,73m2)	71,7 ± 17	70,6 ± 19	NS
C-Reactive Protein (mg/dL)	0,92 ± 0,77	1,08 ± 0,9	0,01
ESR (mm/h)	19,2 ± 15	26,9 ± 23	<0,001
GGT (U/L)	45,6 ± 116	55,25 ± 61	0,06

Elevated glycated hemoglobin variability is significantly associated with elevated inflammatory marker levels, renal function compromise and greater degrees of albuminuria. When using 1% as the HbA1c variability threshold (close to the sample mean – 0,95%), a statistically significant correlation between lipid profile, renal function, albuminuria and inflammatory marker level control (p<0,001) was documented.

CONCLUSIONS

Despite being a retrospective study, with its expected limitations, the sample size allowed the authors to document a possible association between glycemic variation, renal disease progression, subclinical inflammation and blood lipid profile.

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