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Original Article

Is there a relationship between stature and age of onset of type 2 Diabetes?

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ABSTRACT

Aims: MSP1A and MSP1B polymorphic sites located in the GH genomic area have been found associated with GH response to insulin stimulation, with familiar short stature and with age at onset of Type 2 Diabetes (T2D). These observations prompted us to search for a possible relationship between stature and age at onset of the disease.
Methods: We have reexamined the data of 272 subjects with T2D mellitus.
Results: There is a highly significant negative correlation between stature and age at onset in non obese females ($p < 0.001$) but not in obese females and in males. In non obese females with stature within the first quartile the mean age at onset is 62 years while in those with a stature greater than the first quartlile the mean age at onset is 52 yesrs ($p < 0.001$). No difference is observed in obese females and males.
Conclusions: These observations suggest the existence of different mechanisms underlying susceptibility to T2D. In addition to the well known increased risk due to obesity, endocrine dysfunctions related to genetic variability within the GH genomic area could represent another mechanism operating in non obese females. A cluster of non obese women characterized by short stature and late onset of diabetes seems to be separated by this mechanism from other women.

1. Introduction

Previous studies have shown that alleles of MSP1A and MSP1B sites located in GH genomic area are associated with GH response to insulin provocative test, with short stature in children and with age at onset of Type 2 Diabetes (T2D) [1,2].

Moreover, the proportions of carriers of MSP1A*2 allele and MSP1B*2 allele are higher in T2D than in controls ($p < 0.05$-data not published). These observations prompted us to search for a possible relationship between stature of the patients and age at onset of T2D.

2. Material and methods

Subjects: We have reexamined the data on 272 subjects with T2D.

Clinical data on these patients have been reported in a previous paper [3]. The subjects gave verbal informed consent to partecipate to the study that was approved by the Council of Department. Correlation coefficients and *t*-test for difference between means were performed by commercial software (SPSS).

3. Results

Table 1 shows the correlation between age at onset of T2D and stature. A highly significant negative correlation between age at onset and stature is observed in non obese females. Males and obese females do not show statistically significant correlations.

Table 2 shows age at onset of T2D in subjects with a stature within the first quartile as compared to other subjects. Non obese females with a short stature show an age at onset much higher as compared to other women (61 yrs vs 51 yrs; $p < 0.001$). Such difference is much less marked and statistically not significant in obese females and it is not observed in males.

No significant correlation of stature with blood glucose, glycated Hb, dyslipidemia and hypertension has been observed.

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Table 1
Correlation between age at onset of T2D and stature.

	Correlation coefficient	Significance	N° of subjects
All subjects	−0.114	0.060	272
Obese	−0.078	0.396	120
Non obese	−0.214	0.008	152
Male	−0.073	0.414	126
Female	−0.293	0.000	146
Female non obese	−0.476	0.000	76
Female obese	−0.106	0.380	70

Table 2
Age at onset of diabetes in subjects with a stature equal or lower than the first quartile.

Stature	Age at onset (YRS)		T-test for difference between means
	Mean	S.E.	
All subjects			
≤1st quartile	57.62	1.23	P = 0.005
>1st quartile	53.35	0.76	
Non obese			
≤1st quartile	61.21	1.64	P = 0.001
>1st quartile	53.51	0.97	
Obese			
≤1st quartile	54.97	1.65	P = 0.402
>1st quartile	53.16	1.25	
Male			
≤1st quartile	55.33	2.40	P = 0.902
>1st quartile	54.56	0.97	
Female			
≤1st quartile	57.73	1.28	P = 0.001
>1st quartile	51.55	1.21	
Female non obese			
≤1st quartile	61.21	1.64	P = 0.000
>1st quartile	51.19	1.74	
Female obese			
≤1st quartile	54.94	1.79	P = 0.242
>1st quartile	52.03	1.64	

4. Discussion

Previous data suggest that the genomic area of GH located between MSP1A and MSP1B sites may have an important role in controlling stature, GH response to insulin stimulation and susceptibility and age of onset of T2D [1,2]. The present observation points to a negative relationship between stature and age at onset: such relationship is present and highly significant in non obese females only. The data may suggest a different mechanism underlying the susceptibility to T2D in non obese women compared to the mechanism operating in obese women. The fact that such effect is present in females only points to an important role of hormonal factors.

It is well known that obesity predisposes to T2D: many obese subjects, however, do not become diabetic while non obese subjects may experience the disease.

It is possible that endocrine dysfunction may represent an important mechanism differentiating a cluster of diabetics characterized by female sex, short stature, lack of obesity and late onset of the disease from other diabetics in which obesity has a preeminent role. Further studies in these area would be rewarding.

Conflicts of interest

Authors have none interest.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.dsx.2018.09.003.

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