

BMI WEIGHTED GENETIC RISK SCORE (GRS) IN PROSTATE CANCER PATIENTS FROM A ROMANIAN SAMPLE

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Objectives

The relation between body mass index (BMI) and prostate cancer (PrCa) is controversial. The inconsistencies might be attributed to a possible interaction with common risk factors such as age, calory intake, mitogenic hormones. The genetic risk is unlikely to be affected by such causes and can provide a good evidence on how association of obesity and PrCa can arise. In this study we report on the combined effect of several single nucleotide polymorphisms (SNPs), previously proved to be associated with PrCa in a Romanian sample, and BMI observed in early and middle adulthood on PrCa incidence. This study was funded in part by The European Union FP7 (ProMark project 202059) and by the EEA grant (ROMCAN project RO14-0017).

Methods

The study included 979 cases aged 70.9 ± 8.0 years and 1027 controls aged 63.2 ± 12.8 years. We created a genetic risk score (GRS) by summing the risk alleles (0, 1 or 2) for all 34 SNPs genotyped for each subject. Data on height and weight were collected by a questionnaire; BMIs were calculated at age of 20y (BMI₂₀) and age of 40y (BMI₄₀) (Table 1). All analyses were performed with Stata MP13 software.

Results

The GRS was significantly associated with PrCa with OR=1.12 (95%CI: 1.09, 1.14; $p < 0.0001$). We found no direct association between BMI and prostate cancer, alcohol consumption, smoking or social status.

In cases, all BMIs showed a significantly decrease with increase of GRS, while in controls the trend was non significant and even in opposite direction (Table 2). We obtained weighted GRS (wGRS) dividing GRS by BMI₂₀, respectively by BMI₄₀, for each person. There is a very strong

association between wGRS₂₀, respectively wGRS₄₀ and PrCa (Table 3); the association was not confounded by age.

Conclusion

The very strong association between all wGRSs and PrCa indicates that the risk for PrCa significantly increases not only with the number of risk alleles but also with decreasing BMI.

Table 1 GRS (no. of alleles) and BMIs (kg/m²) for cases and controls

	Cases	Controls
GRS (median, range)	30(3-42)	32(18-43)
BMI ₂₀ (mean±SD)	22.86±2.28	23.29±2.26
BMI ₄₀ (mean±SD)	25.47±2.88	26.05±3.03

Table 2 Linear regression BMI vs. GRS

Cases			Controls	
	β (95%CI)	p	β (95%CI)	p value
BMI ₂₀	-0.043(-0.080,-0.007)	0.019	0.009(-0.026,0.045)	0.604
BMI ₄₀	-0.068(-0.117,-0.019)	0.007	0.018(-0.031,0.068)	0.465

Table 3 Logistic regression controls/cases vs. wGRS (no. of alleles/ kg/m²)

	Range		OR(95%CI)	p value
	Cases	Controls		
wGRS ₂₀	0.74-2.27	0.14-2.52	8.37(5.44-12.86)	<0.000001
wGRS ₄₀	0.61-2.08	0.12-1.87	9.03(5.59-14.58)	<0.000001