



Associations of age-dependent IGF-1 standard deviation scores with BMI and waist-to-tallness ratio

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Background

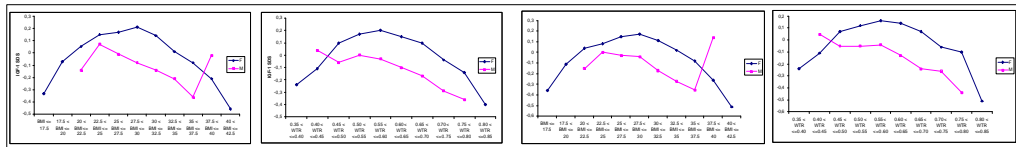
Insulin-like growth factor-1 (IGF-1) is a peptide hormone regulated by growth hormone with effects on metabolism, cell cycle and growth. It has antiapoptotic and proliferative effects. Therefore, possible cancer-promoting effects of IGF-1 have been suggested. On the other hand, protective effects of IGF-1 against development of cardiovascular disease have been discussed, even though contradictory results on this topic have been described. Findings on the association of IGF-1 to BMI and abdominal fat accumulation are inconclusive. Recently, age-dependent standard deviation scores (IGF-1 SDS) for IGF-1 assessment with an automated chemiluminescence assay (Nichols advantage) in a healthy population have been published (Rabrant et al. 2005). In this study we wanted to assess the association of IGF-1 SDS to several different measures of obesity in a large and well-defined sample from the DETECT study.

Patients and Methods

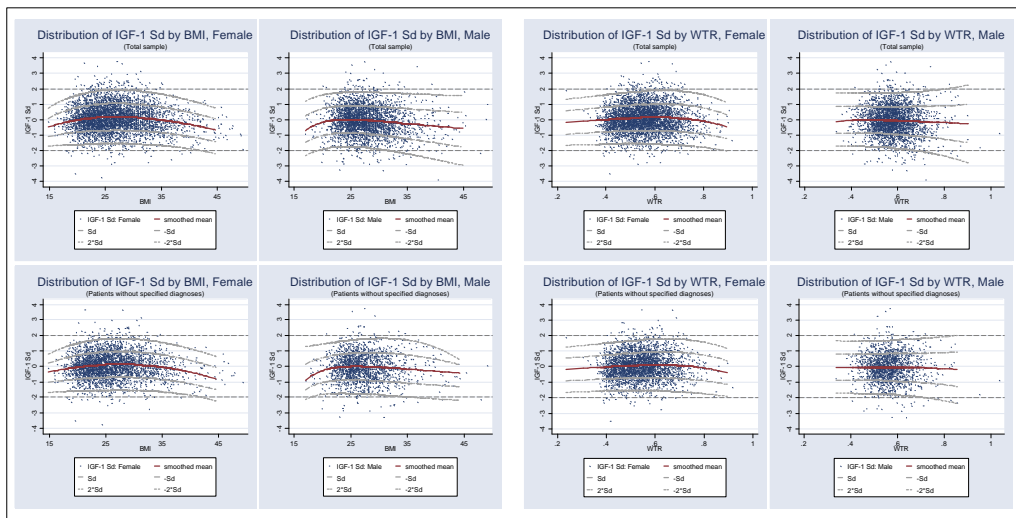
A random sample of 6.282 patients (3.723 women, 2.559 men) of 18 years or older, attending a primary care practice at a specified day were examined. IGF-1 was measured with the Nichols advantage, automated chemiluminescence system and IGF-1 SDS calculated according to Rabrant et al. 2005. BMI, waist circumference (WC), hip circumference (HC), waist-to-hip ratio (WHR) and waist-to-tallness ratio (WTR) were measured and cardiovascular risk factors and diseases were assessed in all patients.

Results

IGF-1 SDS mean values for different groups of BMI and WTR. Left side: All patients (cancer excluded); right side: all patients (arteriosclerosis excluded)



IGF-1 SDS blotted against BMI and WTR with smoothed mean regression and SD curves. Specified diagnoses: cancer, kidney or liver diseases



Explanation of variance (R²) for different anthropometrical parameters in a linear regression model controlling for type 2 diabetes, hypertension, dyslipidemia, CAD, cancer, kidney and liver disease. R² in the reference model indicates explanation of variation only by these factors and R² in the columns for anthropometrical parameters shows the explanation of variation for these factors plus anthropometrical parameters. Beta-Sd indicates the change of mean IGF-1 SDS when the respective anthropometrical parameter increases for 1 SD.

	Reference model			BMI		WC		HC		WHR			WTR			
	R ²	R ²	Beta-Sd	CI (95%)	R ²	Beta-Sd	CI (95%)	R ²	Beta-Sd	CI (95%)	R ²	Beta-Sd	CI (95%)	R ²	Beta-Sd	CI (95%)
Women	3.09	4.13	-0.0762	-0.101 -0.051	3.30	-0.0483	-0.077 -0.02	3.20	-0.0376	-0.063 -0.012	2.97	-0.0095	-0.035 -0.016	3.24	-0.0382	-0.065 -0.011
men	1.63	2.68	-0.0985	-0.138 -0.059	1.98	-0.0596	-0.103 -0.016	1.76	-0.0314	-0.074 -0.011	1.87	-0.0537	-0.096 -0.011	2.03	-0.0603	-0.103 -0.017
Women, 18-44 years	0.78	1.48	-0.0632	-0.111 -0.016	1.25	-0.0430	-0.1 -0.014	1.35	-0.0460	-0.093 -0.001	0.97	0.0020	-0.049 -0.053	1.27	-0.0433	-0.097 -0.011
Men, 18-44 years	1.51	2.07	-0.0346	-0.133 -0.064	1.58	-0.0929	-0.184 -0.001	1.50	0.0014	-0.083 -0.086	1.37	-0.0895	-0.148 -0.031	1.61	-0.0882	-0.185 -0.008
Women, 45-65 years	1.08	2.80	-0.0517	-0.088 -0.016	2.02	-0.0397	-0.082 -0.002	1.59	-0.0286	-0.066 -0.008	1.10	0.0084	-0.046 -0.029	1.98	-0.0395	-0.088 -0.001
Men, 45-65 years	2.80	2.98	-0.1049	-0.158 -0.051	4.36	-0.0616	-0.124 -0.001	3.58	-0.0410	-0.106 -0.024	4.80	-0.0574	-0.129 -0.014	4.22	-0.0861	-0.148 -0.024
Women, 65+ years	1.77	3.11	-0.0995	-0.144 -0.055	2.13	-0.0891	-0.141 -0.037	1.92	-0.0584	-0.106 -0.011	1.96	-0.0272	-0.077 -0.023	2.47	-0.0798	-0.129 -0.031
Men, 65+ years	3.34	3.04	-0.0762	-0.149 -0.003	3.41	-0.0384	-0.118 -0.041	3.44	-0.0354	-0.107 -0.037	3.29	-0.0126	-0.094 -0.069	3.75	-0.0508	-0.129 -0.027

Summary and conclusions

Age-dependent IGF-1 SDS show an inverse U-shaped curve over BMI more clearly in women than in men.

Among several measures of obesity the BMI shows the strongest negative association with IGF-1 when controlling for other factors.

These interactions should be taken into account when assessing the associations of IGF-1 to other conditions that are related to body fat (such as cardiovascular risk factors).