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THE CORRELATION OF INSULIN RESISTANCE, PROSTATE VOLUME AND SERUM PSA

Hypothesis / aims of study

Benign prostatic hyperplasia (BPH) is a prevalent disease in the older men characterized by augmented cell proliferation and contractility of the prostate gland. Several reports proposed the critical role of obesity and insulin-resistance (IR) associated complications in the pathogenesis of BPH. We investigated the relationship between IR and prostate volume and serum prostate specific antigen (PSA) in Korean men.

Study design, materials and methods

A total of 4,039 men visited health care center were enrolled from January 2014 to December 2015. We excluded 347 men who had abnormal serum PSA level (≥ 4ng/ml), history of prostate surgery or who were taking prostate related medication. Prostate volume by transrectal ultrasonography of the prostate, serum PSA, digital rectal examination, urinalysis, and metabolic syndrome parameters were investigated. The homeostasis model assessment of insulin resistance (HOMA-IR) index was calculated using the HOMA algorithm, glucose in mg/dl × insulin in μU/ml/405. The IR cutoff was defined as 2.0 based on a study of Korean Men.

Table 1. Comparison of prostate volume and serum PSA according to metabolic parameters and insulin resistance

Variables		n	PV (cc)	p-value	PSA (ng/mL)	p-value
Age (years)	< 50	2659	20.51±5.03	<0.001	0.96±0.55	<0.001
	≥ 50	1033	25.28±8.24		1.04±0.62	
WC (cm)	< 90	2857	21.26±5.96	<0.001	0.99±0.57	0.20
	≥ 90	835	23.86±7.91		0.96±0.57	
FBS (mg/dl)	< 100	2647	21.95±6.21	0.11	0.99±0.57	0.33
	≥ 100	1045	21.58±7.05		0.97±0.58	
TG (mg/dl)	< 150	2562	21.58±6.23	<0.001	0.99±0.57	0.18
	≥ 150	1130	22.45±6.92		0.96±0.57	
HDL-C (mg/dl)	≥ 40	3218	21.66±6.34	<0.001	0.98±0.57	0.29
	< 40	474	23.14±7.09		0.95±0.57	
SBP (mmHg)	< 110	794	21.60±5.39	0.89	1.00±0.60	0.38
	≥ 110	2898	21.63±6.38		0.98±0.56	
DBP (mmHg)	< 85	3247	21.67±6.31	<0.001	0.98±0.57	0.55
	≥ 85	445	23.13±7.35		1.00±0.59	
HOMA-IR	< 2	3101	21.68±6.28	0.002	1.00±0.58	<0.001
	≥ 2	591	22.68±7.31		0.89±0.53	

WC: waist circumference, FBS: fasting blood sugar, TG: triglyceride, HDL-C: high density lipoprotein cholesterol, SBP: systolic blood pressure, DBP: diastolic blood pressure, HOMA-IR: homeostatic model assessment-insulin resistance, PV: prostate volume, PSA: prostate-specific antigen

Table 2. Multiple logistic regression models to determine independent predictors associated with PV and PSA

Variables	Odds ratio	95% CI	p-value
PV			
Age (≥50 years)	2.624	2.233-3.083	<0.001
Abnormal WC	1.904	1.587-2.285	<0.001
Abnormal TG	1.091	0.929-1.287	0.289
Abnormal HDL-C	1.209	0.971-1.506	0.090
Abnormal DBP	1.237	0.996-1.536	0.055
IR	0.910	0.739-1.120	0.372
PSA			
Age (≥50 years)	1.404	1.149-1.714	0.001
IR	0.587	0.433-0.781	<0.001

PV: prostate volume, WC: waist circumference, TG: triglyceride, HDL-C: high density lipoprotein cholesterol, DBP: diastolic blood pressure, IR: insulin resistance, PSA: prostate-specific antigen, CI: confidence interval.

Results

The mean of age, serum PSA, prostate volume were 45.24±7.78 years, 0.98±0.57 ng/mL, 21.63±6.18 cc, respectively. Prostate volume was significantly larger in the IR-group (22.66±7.31 cc) than in the non-IR group (21.68±6.28 cc). In univariate analysis, serum PSA was correlated with age and IR. Prostate volume was correlated with age, IR, waist circumference (WC), triglyceride, high density lipoprotein cholesterol, diastolic blood pressure (Table 1).

Interpretation of results

In multivariate analysis, serum PSA was negatively correlated with IR compared to positive correlation of age and serum PSA. However, IR was not correlated with prostate volume in multivariate analysis and age, WC were the only factors that positively correlated with prostate volume (Table 2).

Concluding message

These results suggest that the serum PSA level is significantly influenced by age and IR. Although IR was not risk factor of prostate volume enlargement, normal range of serum PSA should be considered in association with IR and prostate volume as well as age.

Disclosures

Funding: None **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Kangbuk Samsung Hospital Institutional Review of Board **Helsinki:** Yes **Informed Consent:** Yes