The Prevalence of Metabolic Syndrome and Its Relation with Chronic Diabetic Complications in the Korean Type 2 Diabetic Patients

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Abstracts

The components of metabolic syndrome(MS) are associated with an increased risk of both micro- and macrovascular complications of diabetes mellitus. In this study, we examined the prevalence of metabolic syndrome in Korean type 2 diabetic patients and investigated the relation between the components of metabolic syndrome and chronic diabetic complications. Total 989 Korean patients (452 men and 537 women, 59±10 year of age) with type 2 diabetes were studied. Metabolic syndrome was defined by NCEP-ATP III criteria or by modified NCEP-ATP III criteria which adopt the definition of abdominal obesity in Asia-Pacific region (M: >90 cm, F: >80 cm). We evaluated each component of metabolic syndrome and also diabetic microcvascular complications. We identified the clinical history of cardiovascular diseases by review of medical records or history taking. The prevalence of metabolic syndrome in Korean type 2 diabetic patients was 62.0% (53.7% in men and 68.9% in women) by ATP III criteria and 76.0% (68.8% in men and 82.1% in women) by modified NCEP-ATP III criteria. Patients with metabolic syndrome showed an increased risk of nephropathy (OR=1.967, CI=1.353-2.861, p<0.001) and cardiovascular diseases (OR=1.796, CI=1.048-3.078, p=0.033) regardless of age, sex, and duration of diabetes. The prevalence of both diabetic nephropathy and cardiovascular disease showed an increasing tendency in accordance with the increasing number of components of metabolic syndrome except diabetes (p<0.001). In conclusion, the prevalence of metabolic syndrome in Korean type 2 diabetic patients was 76.0%. Metabolic syndrome in type 2 diabetic patients was associated with the risk of cardiovascular diseases and diabetic nephropathy as well.

Backgrounds

1. The components of metabolic syndrome are associated with an increased risk of both micro- and macrovascular complications of diabetes mellitus.
2. There are few studies that reported the prevalence of metabolic syndrome in type 2 diabetic patients according to the third report of the National Cholesterol Education Program Adult Treatment Panel (NCEP-ATP III) and its relation with chronic diabetic complications.

Aims

1. To examine the prevalence of metabolic syndrome in type 2 diabetic patients using the definition proposed by NCEP-ATP III
2. To examine the relation between metabolic syndrome and chronic diabetic complications

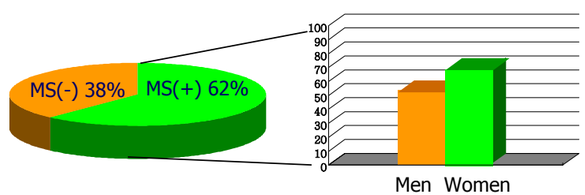
Methods

1. Total 989 patients (452 men and 537 women) with type 2 diabetes from Seoul National University Hospital were recruited from Seoul National University Hospital.
2. Blood pressure, waist circumference, hip circumference, fasting plasma glucose, total cholesterol, HDL-cholesterol, triglyceride, blood urea nitrogen, serum creatinine and urine microalbumin were measured.
3. We also performed fundus examination and identified the clinical history of coronary artery disease, cerebrovascular disease and peripheral artery disease.

Clinical and Metabolic Characteristics of Study Subjects

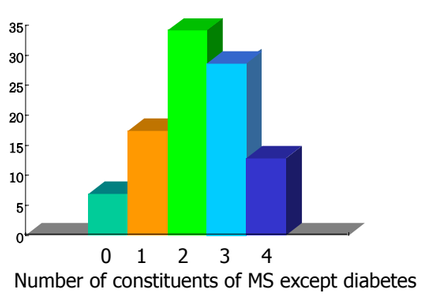
	Total	MS(+)	MS(-)	p
N(male/female)	989(452/537)	752(311/441)	237(141/96)	
Age (years)	59±10	61±9	56±11	NS
Duration (years)	9.6±7.9	9.5±7.6	10.4±8.6	NS
BMI (Kg/m2)	24.4±2.9	25.0±2.8	22.4±2.5	<0.001
WHR	0.91±0.30	0.93±0.34	0.87±0.05	0.012
Waist circumference (Cm)	87.2±8.1	89.2±7.5	81.2±6.7	<0.001
SBP(mmHg)	135±20	139±19	124±19	<0.001
DBP(mmHg)	82±31	84±35	75±11	<0.001
FPG (mmol/L)	8.4±2.5	8.5±2.5	8.2±2.7	NS
HbA1c (%)	7.9±1.5	7.9±1.5	7.8±1.7	NS
Total cholesterol (mmol/L)	5.13±0.95	5.18±0.96	4.98±0.92	0.004
Triglyceride (mmol/L)	1.89±1.25	2.11±1.33	1.21±0.58	<0.001
HDL-cholesterol (mmol/L)	1.23±0.30	1.18±0.28	1.39±0.31	<0.001
Lipid-lowering therapy (%)	15.3	16.3	12.2	NS
Antihypertensive therapy (%)	36.7	43.4	16.0	<0.001

Prevalence

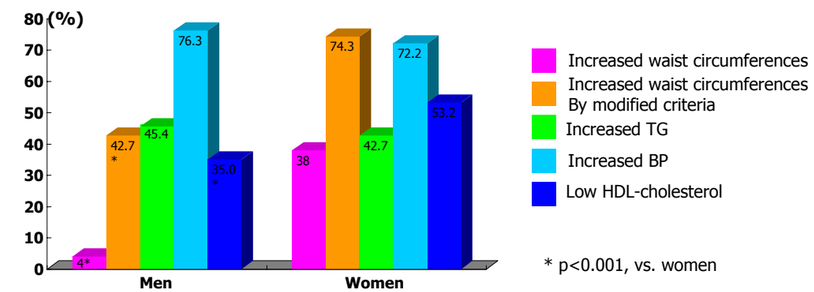


Prevalence

Constituents of Metabolic syndrome



Distribution of constituents of MS except diabetes



MS and Diabetic Nephropathy

Number of the constituents of MS	Prevalence of Nephropathy		OR(95% CI)*	p for trend**
	Number of subjects with nephropathy (%)	Number of subjects without nephropathy (%)		
0	12 (4.2)	53 (7.9)	1	
1	39 (13.6)	126 (18.8)	0.85 (0.38-1.87)	
2	96 (33.4)	235 (35.0)	1.36 (0.67-2.77)	<0.001
3	77 (26.8)	197 (29.4)	1.80 (0.87-3.70)	
4	63 (22.0)	60 (8.9)	6.81 (2.77-16.77)	

MS and Cardiovascular disease (CVD)

Number of the constituents of MS	Prevalence of Cardiovascular disease		OR(95% CI)*	p for trend**
	Number of subjects with CVD (%)	Number of subjects without CVD (%)		
0	2 (1.4)	32 (5.7)	1	
1	20 (14.2)	88 (15.7)	1.62 (0.31-8.39)	
2	42 (29.8)	204 (36.4)	2.46 (0.54-11.20)	<0.001
3	45 (31.9)	162 (28.9)	4.67 (1.04-21.02)	
4	32 (22.7)	74 (13.2)	5.40 (1.17-24.86)	

Summary and Conclusions

1. The prevalence of metabolic syndrome in Korean type 2 diabetic patients was 62.0% (53.7% in men and 68.9% in women).
2. The prevalence of both diabetic nephropathy and cardiovascular disease showed increasing tendency in accordance with the increasing number of components of metabolic syndrome except diabetes.