THE WEIGHT OF OBESITY AND METABOLIC SYNDROME ON RENAL FUNCTION

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Background

It is widely accepted that metabolic syndrome, a cluster of cardiovascular risk factors often related with obesity, is associated with an increased risk of chronic kidney disease (CKD). Obesity itself has been found to be a strong independent risk factor for end stage renal disease even after adjustment for other major risk factors.
The aim of this study is to investigate whether, besides metabolically abnormal obesity (MAO), also metabolically healthy obesity (MHO) phenotype is associated with increased risk of renal dysfunction.

Patients and methods

Obese patients (80 females, 21 males; BMI 34-68 kg/m^2, average 48; mean age 46 years; serum creatinine 0.3-2.3 mg/dl), admitted to the Department of Endocrinology of Pisa Hospital between 2009 and 2012. Patients were classified as MHO (n=40) or MAO (n=61) according to the absence or presence of metabolic syndrome (Adult Treatment Panel-III criteria); clinical and biochemical parameters were then compared (Student's T test) in the two groups. Results were presented as mean±SD. A p value<0.05 was considered significant. A multiple regression model was used to investigate the predictors of decreased GFR (CKD-EPI-Cr equation).

Results

The prevalence of metabolic syndrome was 60.4% (n=61, males=19) (Table). No significant differences were observed in age and BMI between the two groups, whereas MAO phenotype was associated with significantly higher values of waist circumference and waist-hip ratio. As expected, also other metabolic parameters (systolic blood pressure, serum glucose, glycated hemoglobin, serum triglycerides, HDL and LDL and even serum uric acid) were higher in MAO phenotype. Serum creatinine and urea, markers of renal function, were significantly lower in MHO patients. No significant differences were observed in eGFR (CKD-EPI-Cr), proteinuria and albuminuria between the two groups.
Multivariate analysis demonstrated that older age (p<0.0001), higher serum uric acid (p=0.0002), lower body surface area (p<0.0001) and higher urine albumin-creatinine ratio (p=0.0037) were independent risk factors for lower eGFR.

	MHO n=40	**MAO n=61**	**p**
Male/Female	2/38	19/42	0.001
Age (years)	44±10	48±11	NS
Systolic Blood Pressure (mmHg)	127±15	133±13	0.044
Diastolic Blood Pressure (mmHg)	81±9	83±8	NS
Fasting blood glucose (mg/dl)	86.7±10.6	123.4±61.6	0.0003
Glycated hemoglobin (%)	5.7±0.4	7.7±2.2	0.0001
BMI (kg/m^2)	46±7	49±7	NS
Waist circumference (cm)	130±17	137±15	0.018
Hip circumference (cm)	138±14	138±16	NS
Waist/Hip Ratio	0.95±0.12	1.00±0.09	0.009
Serum uric acid (mg/dl)	5.3±1.2	6.1±1.6	0.0064
Triglycerides (mg/dl)	110±38	186±108	0.0001
Total Cholesterol (mg/dl)	186±30	197±40	NS
LDL-Cholesterol (mg/dl)	114±24	127±35	0.049
HDL-Cholesterol (mg/dl)	52±12	42±11	0.00002
Serum Creatinine (mg/dl)	0.68±0.16	0.79±0.29	0.043
Blood urea (mg/dl)	27.8±7.8	34.4±15.2	0.017
CKD-EPI-Cr (ml/min/1.73 m^2)	104.8±16.4	98.3±20.5	NS
Proteinuria 24h (mg)	262.0±223.3	376.8±612.9	NS
Albuminuria (mg/g creatininuria)	11.2±19.5	44.3±142.5	NS

Conclusions

The major risk factor for impairment in GFR in obese patients are older age, higher serum uric acid, lower body surface area, and higher urine albumin-creatinine ratio. Renal function is less affected in metabolically healthy than in metabolically abnormal obese patients.

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