METABOLIC SYNDROME AND CALCIUM KIDNEY STONES

Giovanna Capolongo, Arianna Restivo, Maria Pluvio, Giovambattista Capasso
Division of Nephrology, Second University of Naples. Naples, Italy.

BACKGROUND

Nephrolithiasis remains a formidable worldwide health problem. Metabolic syndrome (MS), characterized by truncal obesity, hypertriglyceridemia, hypertension and insulin resistance, has been found to be associated with an increased prevalence of uric acid nephrolithiasis. An overly acidic urine has been previously described as a renal manifestation of the metabolic syndrome in patients with kidney stone disease. However it is not know whether subjects with MS suffer from uric acid nephrolithiasis alone. Despite the high prevalence of the calcium nephrolithiasis in kidney stones formers, studies on calcium stones in MS are controversial. In this study, the incidence and risk factors for calcium kidney stones formation have been evaluated in selected groups of subjects with MS in South Italy.

DESIGN AND PARTECIPANTS

A total of 126 patients were selected for the study. They were divided in three gr
N = 42 adults with nephrolithiasis, MS + N = 44 patients affected from meta
syndrome and nephrolithiasis, MS = 40 subjects with metabolic syndrome. Demogra
and biochemical characteristics were evaluated for each group. All participants colle
a 24-h urine for evaluation of urinary composition.

METHODS

Results are presented as means ± SD. Categorical comparisons were conducted
the χ^2 test.
Serum measurements included electrolytes, creatinine, glucose, triglycerides, tota
HDL cholesterol and uric acid. Twenty-four-hour urine was analyzed for total volum
creatinine, sodium, potassium, calcium, magnesium, uric acid, chloride, phospl
oxalate and citrate.

RESULTS

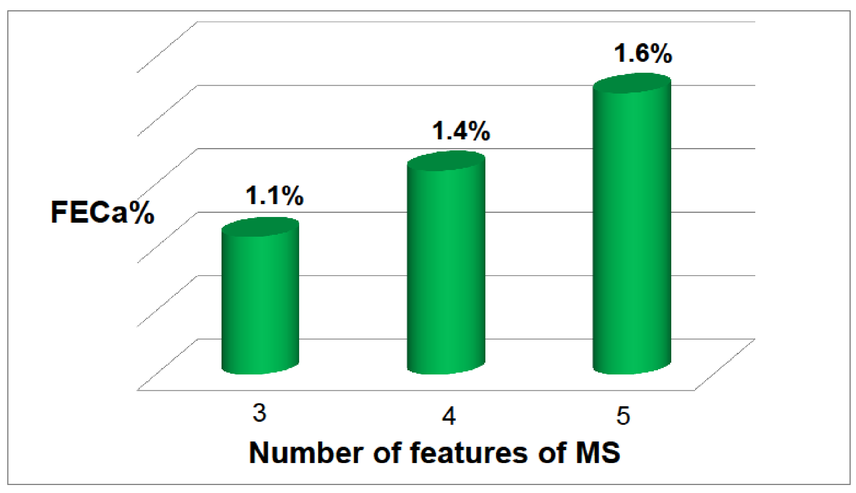
Demographic characteristics are presented in Table1. There was no significant difference in gender and ethnic distributions between groups.

PARAMETRES	N (42)	SM + N (44)	SM (40)	*p*
Age, years	40 ± 10	48 ± 16	45 ± 13	0.05
BMI, kg/m^2	23.8 ± 3.5	31.1 ± 2.6	29.7 ± 3.6	<0.001
Systolic BP, mmHg	125 ± 5	129 ± 10	141 ± 16	0.71
Diastolic BP, mmHg	73 ± 7	83 ± 3	81 ± 5	0.003
Glucose, mg/dL	84 ± 7	119 ± 10	138 ± 69	<0.001
Triglycerides, mg/dL	89 ± 21	225 ± 79	243 ± 93	0.02
HDL cholesterol, mg/dL	48.2 ± 6.2	37.4 ± 10.2	41.7 ± 15.7	<0.001

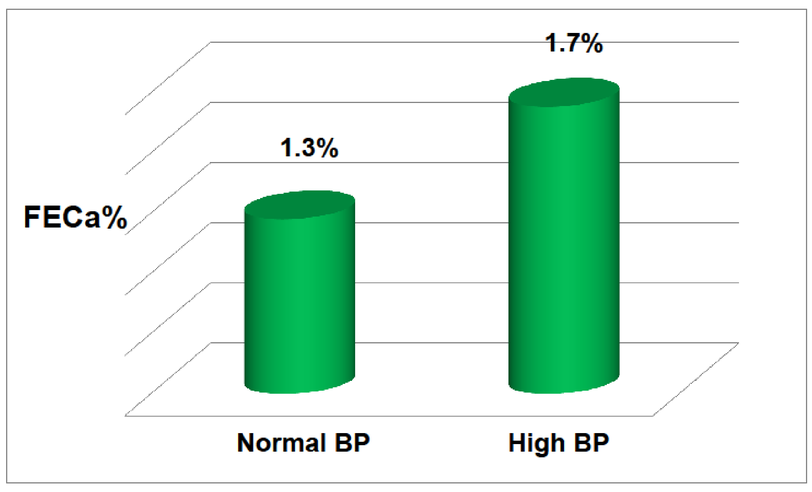
Urinary parametres are shown in Table 2. Calcium excretion was significantly higher in N and MS + N than in MS patients (FeCa 1.4% and 1.5% respectively vs 0.8%, p <0.05).

PARAMETRES	N (42)	SM + N (44)	SM (40)	*p*
pH	6.08 ± 0.55	5.68 ± 0.60	5.42 ± 0.56	< 0.05
Creatinine (g/day)	1.5 ± 0.8	1.4 ± 0.5	1.6 ± 0.2	0.42
Sodium (mEq/day)	173 ± 61	153 ± 75	151 ± 71	0.23
Calcium (mg/day)	233 ± 133	202 ± 107	108 ± 81	< 0.05
FE Ca (%)	1.4 ± 0.8	1.5 ± 0.8	0.8 ± 0.4	< 0.05
Citrate (mg/day)	438 ± 195	414 ± 102	390 ± 109	< 0.05

In MS + N the incidence of hypercalciuria increased with the number of the features of metabolic syndrome.



Patients with MS + N without hypertension had lower urinary calciu
excretion (145 ± 56 mg/day; FECa 1.3%) when compared with patients i
the same group with high blood pressure (238 ± 114 mg/day; FECa 1.7%)



However, in patients with MS without Nephrolithiasis there were n
urinary abnormalities that allow the formation of calcium stones (Calciu
108 ± 81 mg/day, Phosphorus 0.9 ± 0.3 g/day, Oxalate 30 ± 5 mg/day).

CONCLUSIONS

Hypercalciuria is a major risk factor for calcium stone formation.
In subjects with a history of nephrolithiasis, the urinary calcium excretion increases with the number of the features of MS and it is more prevalent in patients with high blood pression. This phenomenon may be related to the down- regulation of calcium transport along the renal distal tubule in salt-sensitive hypertension previously demonstrated.

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Giovanna Capolongo
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