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Indices of Lithogenic Activity in Patients with Primitive Calcium Oxalate Urolithiasis

A. Cupisti, F. Ciardella, E. Morelli, S. Lupetti, S. Luchi, F. Niosi, A. Fosso, A. Carlini, M. Meola, G. Barsotti

Clinica Medica I, Università degli Studi, Pisa, Italia

The discrimination between recurrent calcium-oxalate stone formers (RSF) and single stone formers (SSF) is of critical value for the prognosis and preventive therapy. In this retrospective study we tried to detect any correlation between the clinical lithogenic activity and the urinary excretion of some inhibitors or promoters of stone formation [1].

Materials and Methods

23 RSF (21 males and 2 females), 23–56 years old, 14 SSF (9 males and 5 females) aging between 28 and 46 years, and 16 normal volunteers (11 males and 5 females), 28–44 years old were studied. In all the patients we evaluated the 24-h urinary excretion of calcium (uCa), uric acid (uU), oxalic acid (uOx), citrate (uCit), magnesium (uMg), glycosaminoglycans (uGAG) and daily urinary volume (uV). In addition, the following indices of lithogenic activity were calculated: uOx/uCit and uOx·uCa/uCit·uGAG.

uOx and uCit were determined by enzymatic assays [2, 3], uGAG by Alcian blue 8GS procedure [4], and the other parameters by routine laboratory methods. The statistical analysis of the results was performed by means of Student's t-test for unpaired data.

Results

The results are shown in figure 1. A significant statistical difference was found between RSF and SSF for uCit (2.13 ± 0.93 vs 3.26 ± 0.88 mmol/day, respectively; $p < 0.001$) and uOx (30.3 ± 8.0 vs 22.9 ± 4.9 mg/day; $p < 0.005$). In normals uCit (3.37 ± 0.02 mmol/day) and uOx

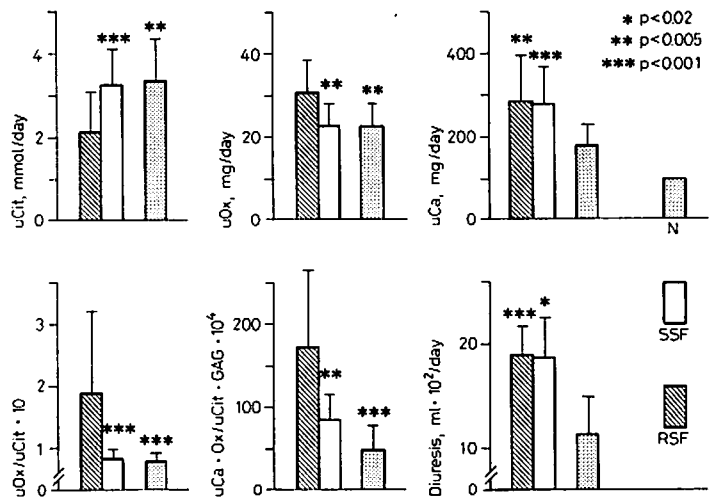

Fig. 1. The behaviour of some urinary risk factors and indices in RSF, SSF and normals (mean ± SD).

(22.7 ± 5.6 mg/day) were similar to SSF, while an evident statistical difference was found versus RSF (fig. 1).

RSF and SSF did not differ for uCa (284.6 ± 109.9 vs 283.7 ± 83.3 mg/day) while both groups showed higher uCa levels than normals (182.2 ± 49.7 mg/day; $p < 0.005$ and $p < 0.001$, respectively); uV also showed a similar behaviour (fig. 1).

uOx/uCit was higher in RSF than either in SSF (1.903 ± 1.303 vs 0.836 ± 0.414; $p < 0.001$) or in normals (0.819 ± 0.256; $p < 0.001$), just like the uCa·uOx/uCit·uGAG ratio (172.8 ± 90.0 vs. 84.6 ± 30.6, $p < 0.005$ and vs 46.6 ± 26.8, $p < 0.001$, respectively). None of the studied groups differed in regard to uU and uMg.

Discussion

These results suggest that hypercalciuria is a less important factor than high levels of uOx or low levels of uCit for the evaluation of lithogenic activity in patients with primitive calcium oxalate stone disease. Furthermore, uOx/uCit and uOx·uCa/uCit·uGAG ratios may be useful to this aim,

just pointing out the promoters-inhibitors imbalance that is present in the recurrent calcium oxalate stone disease.

The failure of thiazide preventive therapy in some RSF [5] may be explained by our results. In fact uCit may be lowered by thiazides [6] and uOx is not often modified while the hypocalciuric effect is largely proved [7].

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Prof. Giuliano Barsotti, MD, Clinica Medica I, Università degli Studi,
I-56100 Pisa (Italy)