Increased Levels of Blood Angiotensin-Converting Enzyme in Idiopathic Hypercalciuric Renal Stone Formers

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Dear Sir,

Hypercalciuria is one of the most common causes of recurrent renal stone formation [1]. In some cases, sarcoidosis is the cause of this hypercalciuria [2]. In order to detect patients with sarcoidosis, serum angiotensin-converting enzyme (ACE) level, a well-known index of disease activity [3, 4], was measured by spectrophotometry assay using hippuryl-histidyl-leucine as substrate [4] in all of our hypercalciuric renal stone formers. Chest radiography, spleen echography and gallium scintigraphy were performed in all patients with increased serum ACE activity in order to confirm sarcoidosis but true sarcoidosis was found in only 2 out of 38 cases.

For this reason, we compared, in a short retrospective study, the serum levels of ACE of our idiopathic hypercalciuric renal stone formers to normal subjects. None of our patients had granulomatous diseases or other illness with commonly disturbed levels of serum ACE as hyperthyroidism, lymphoma, diabetes mellitus, renal failure, etc. [4]. Results are given in table 1. Statistical analysis was performed by Student's t test and χ^2 Pearson tests.

In normal subjects, ACE was slightly higher in males ($p < 0.05$), independently of age, as described by Lieberman [3]. Sex ratio was higher in the stone formers group ($p < 0.001$). Mean serum ACE activity of the stone formers group was statistically higher compared to the normals, especially in males ($p < 0.000001$ between males, $p < 0.01$).

Table 1. Serum ACE activity in idiopathic hypercalciuric renal stone formers and healthy controls (mean $\pm$ SD)

Controls (n = 135) (n = 69)	Idiopathic hypercalciuric p renal stone formers	p
1.1		
NS < 0.001		
< 0.000001	0.01	
44.4 $\pm$ 1.6		
2.7		
30.6 $\pm$ 10.4	26.4 $\pm$ 7.6	
Age, years	42.6 $\pm$	
Sex ratio (m/f)	1.05	ACE activity, nmol/ml/min
:6.5 :5.4		
Males	23.1:	
Females	21.2:	

tained during an oral calcium load performed in all of our hypercalciuric stone formers as described by Pak et al. [5]. No correlation was found.

In conclusion, our results demonstrate that serum ACE is slightly but significantly increased in idiopathic hypercalciuric renal stone formers, especially in males. The significance of this increase remains to be established.

between females). If we divided our idiopathic hypercalciuric stone formers into an absorptive and a renal subgroup according to Pak's classification [5], we found an increased level of serum ACE in both subgroups compared to normal but this increase was slightly but not significantly higher in the absorptives (29.5 ± 8.6 vs. 28.1 ± 10.1 nmol/ml/min). This last observation was probably due to a difference in sex ratio (3.8 in the absorptives and 1.4 in the renals: $p < 0.05$). The possibility of an involvement of ACE in the intestinal absorption of calcium, since sarcoidosis's hypercalciuria is mainly an absorptive type [6], was also analyzed by a correlation between serum ACE and the increase of calciuria (Δ Nordin index) ob-

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