Renal Tubular Dysfunction of Vitamin-D Deficiency Rickets

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Dear Sir,

Rickets evolved from vitamin D deficiency seldom occurs in our environment. However, we have recently diagnosed 2 new cases of this disease, in stages II and III according to the classification of Fraser et al. [1]. The patients, a sister and a brother, were brought up with insufficient sunlight and feeding. Their main analytic data are listed in table 1.

Burgess and Osman [2] found metabolic acidosis in infants suffering from vitamin-D deficiency rickets. Renal tubular dysfunction was associated with the vitamin-D deficiency rickets much later, though. The dysfunction is characterized by one or more of the following anomalies; generalized aminoaciduria [1,3]; glycosuria [4]; renal acidosis [2, 5-8], and urinary loss of magnesium [9, 10]. The cause of the renal tubular dysfunction is commonly related to the secondary hyperparathyroidism, as well as to a phosphate deficit [11, 12].

Although the role of urinary N-acetylglucosaminidase (NAG) as a tubular damage marker is known, we have not found any determinations of this parameter in cases of vitamin-D deficiency rickets in the literature. Indeed, we found high NAG values in our patients (table 1). For comparison, the regular NAG values at our hospital are $7.2 \pm$

5.2 U/g for infants younger than 2 years, and 4.4 ± 2.7 for children from 2 to 6 years old [13].

These high values normalized after treatment with vitamin D. As the only anomaly associated with tubular dysfunction, the patient in stage III showed hyper-chloremic metabolic acidosis. The patient in stage II had none of the anomalies referred to above.

In summary, a high urinary NAG value seems to be an additional anomaly associated with the renal tubular dysfunction of vitamin-D deficiency rickets. It has the advantage of being a very early marker of tubular damage induced by this disease.

Case I Case II

male	female	23	45
8.7	9.2		
2.7	3.9		
110	105		
7,210	1,897		
6	5		
98	91		

155 50

10.1

Table 1. Analytic data of the 2 patients

Sex

Age, months

Serum calcium, mg/dl

Serum phosphate, mg/dl

Serum chloride, mEq/l

Alkaline phosphatase,

IU/l Calcidiol, ng/ml Calcitriol, pg/ml Intact PTH, pg/ml Serum bicarbonate,

14.5

20

mEq/l Urine NAG/creatinine,

49.1

U/g

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