Serum Osteocalcin in Children with Chronic Renal Failure

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Dear Sir,

Conflicting results have been reported on the significance of serum osteocalcin (OC) in patients with chronic renal failure (CRF) [1-3]. Therefore, we studied fasting levels of OC in three different groups of children: group A consisting of 18 patients with terminal renal failure, group B consisting of 12 patients at different stages of CRF and group C consisting of 32 healthy children matched for age. Clinical characteristics of the investigated children are presented in table 1. All patients were without verifiable hepatopathy. Of 30 patients, 26 were treated with CaC03 and 21 with vitamin D analogues. None were treated with aluminum hydroxide. Serum OC was measured by radioimmunoassay using the OSTK PR RIA (CIS). Serum calcium, phosphate and total alkaline phosphatase (ALP) were studied in all, while serum intact immunoreactive PTH (iPTH) and ionized serum calcium were measured in pa-

Table 1. Clinical and Laboratory Data

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tients of group A only. The ELISA-PTH (CIS) radioimmunoassay was used to determine iPTH plasma levels. Statistical analyses were performed using the Kolmogorov-Smirnov test to confirm normal distribution, the Pearson and Spearman rank sum test for correlation between variables of interest, while analysis of variance was used to compare the findings.

There was a significant difference in serum OC levels in all groups ($p < 0.01$); it was three times higher in group A than in group C. A similar increase was noticed for plasma iPTH, assuming that 'normal' uremic iPTH was elevated up to threefold above normal range (between 10 and 60 pg/ml) [4]. The total serum ALP activity was not as sensitive as OC and iPTH, since the increases were more prominent in OC and iPTH than in ALP.

OC was age related only in group A ($p < 0.01$). Positive correlations were observed between OC and the duration of hemodialysis ($p < 0.05$), and between OC and serum

phosphate ($p < 0.05$), but there was no correlation between OC and growth retardation, bone age and current therapy for renal osteo-dystrophy. A direct correlation between OC and ALP was found only in healthy children ($p < 0.01$); in group A and B it was not statistically significant ($p = 0.08$). In group A, ALP and iPTH were directly correlated ($p < 0.001$), but the correlation between OC and iPTH was less significant ($p = 0.06$). In patients with CRF no correlation was found between glomerular filtration rate and OC.

In summary, serum OC concentrations were significantly higher in children with terminal renal failure and CRF compared to healthy children of the same age. A positive correlation between OC and age and duration of chronic hemodialysis suggests that OC may be a useful noninvasive marker for the progredient course of hyperparathyroid bone disease in terminal renal failure. This could make it a suitable tool to target therapy with active vitamin D metabolites.

References

Coen G, Mazzaferre S: Bone metabolism and its assessment in renal failure. *Nephron* 1994; 67:383-401.

Friedman A, Heiliczer J, Gundberg C, Mark R, Beineau F, McEnery P, Chan J and members of the Growth Failure in Children with Renal Disease Study: Serum osteocalcin concentrations in children with chronic renal insufficiency who are not undergoing dialysis. *J Pediatr* 1990;116:S55-S59.

Schmidt-Gayk H, Drücke F, Ritz E: Non-invasive circulating indicators of bone metabolism in uraemic patients: Can they replace bone biopsy? *Nephrol Dial Transplant* 1996; 11: 415-418.

Salusky JB, Ramirez JA, Goodman WG: Disorders of bone and mineral metabolism in chronic renal failure; in Holliday MA, Barratt FM, Avner ED, Kogan BA (eds): *Pediatric Nephrology*. Baltimore, Williams & Wilkins, 1995, pp 1286-1304.

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