Ionized Calcium Cannot Predict Vitamin D Deficiency

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To the Editor,

Vitamin D deficiency (VDD) results from inadequate intake, lack of sun exposure, malabsorption, or genetic abnormalities in vitamin D metabolism. Vitamin D deficiency/insufficiency remains undiagnosed, unless 25-hydroxy vitamin D (25OHD) concentrations are measured. Previously VDD was considered to be prevalent in regions where there was not ample sunlight [1]. However, recent literature suggests extensive VDD in many of the sun drenched countries [2, 3].

Arya et al. [4] reported 78.3% of the healthy hospital staff had 25OHD levels <50 nmol/l in Lucknow India despite abundance of sunshine. Reports from Pakistan have similarly shown high prevalence of 25OHD deficiency [5, 6].

In VDD, plasma calcium is maintained at the expense of bone calcium but persistence of deficiency leads to fall in calcium level and secondary hyperparathyroidism. We reported 30% of asymptomatic adults with 25OHD deficiency and secondary hyperparathyroidism but normal calcium levels [6]. In another report on medical clinic patients, calcium was low in patients with severe VDD only and remained normal in patients with mild and moderate deficiency [5]. However, these studies measured total calcium while the true calcaemic status of individuals is best assessed by ionized calcium.

We determined whether measurement of iCa could detect VDD in blood samples from 40 apparently healthy laboratory staff aged 27 ± 5 years and with no known comorbid. None of the individuals were on any medications including calcium and vitamin D supplements. Blood samples were collected according to recommendations by Clinical and Laboratory Standards Institute (CLSI), iCa and pH were simultaneously along with estimation of 25OHD levels by chemiluminescence methodology.

Ninety percent of the group was 25OHD deficient (25OHD < 50 nmol/l). Subjects with insufficient and sufficient 25OHD levels were 5% each. The difference between mean iCa results in 25OHD deficient, insufficient and sufficient groups were non-significant. Negative poor correlation was observed between iCa and 25OHD levels.

VDD has been widely reported in immigrant Pakistanis to Europe and America. It was suggested that Pakistanis living within homeland are not suffering from VDD as Pakistan is situated between 24° and 37° north latitude and has adequate sunshine. Findings of this study has demonstrated that majority of the healthy population is vitamin D deficient and despite VDD has normal iCa levels, which could be at the expense of mobilization of bone calcium by secondary hyperparathyroidism. These results support the findings of Singh et al. [7] who reported poor correlation between 25OHD insufficiency and other analytes including plasma calcium, alkaline phosphatase or phosphorus levels. Ionized calcium estimation though technically demanding cannot detect VDD/insufficiency. To assess calcium status, total calcium provides enough information. Focus should be on optimization of vitamin D and calcium intake, either by diet or supplementation in our population.

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