Renal bone disease in black dialysis patients: are algorithms developed for white dialysis patients valid?

Sir,

Considering the increasing evidence that abnormalities in serum levels of phosphorus, calcium and parathyroid hormone (PTH) contribute to the risk of cardiovascular disease in patients with renal failure, a group of experts has recommended the use of clinical algorithms for the management of renal osteodystrophy [1]. The group opines that these algorithms may be applicable to renal patients as a group but are not intended to replace the clinical judgement of the physician with detailed knowledge of the individual patient’s medical history (see [2]).

The algorithm on the management of calcium–phosphate metabolism in patients on dialysis recommends use of PTH and total alkaline phosphatase for determining therapy for the treatment of secondary hyperparathyroidism and consequent osteodystrophy. In dialysis patients with normal serum calcium and phosphorus and PTH in 9.18 pmol/l range, the algorithm advocates treatment with low doses of active vitamin D; and parathyroidectomy if PTH exceeds 50 pmol/l despite therapy. These recommendations regarding the management of uraemic hyperparathyroidism by the expert group are based on the correlations between PTH levels and bone turnover that have been largely described in Caucasian dialysis populations, and whether these data apply to other races is not known. We have examined racial differences in the severity of uraemic hyperparathyroidism in a large population of dialysis patients [3]. Using a step-wise multiple regression model the determinants of maximum PTH in the order of their importance were black race, serum phosphorus, absence of diabetes, younger age, serum calcium and female gender. The maximum PTH levels averaged about 650 pg/ml in blacks and 350 pg/ml in whites after adjusting for age, gender, diabetic status, serum calcium and phosphorus (P < 0.0001). Therefore, race is a major independent determinant of uraemic secondary hyperparathyroidism. However, more severe uraemic hyperparathyroidism in blacks may not necessarily lead to more severe hyperparathyroid bone disease since black patients may have a relative resistance to PTH action as suggested by decreased serum Gla protein and bone turnover despite an increase in serum PTH in black subjects without renal disease [4,5]. Therefore, more severe uraemic hyperparathyroidism in blacks may be a physiological adaptive response to maintain bone turnover. Based on studies conducted predominantly in white subjects, an intact PTH level of 120–240 pg/ml (2–4×normal) is considered optimal in ESRD [6]. If parathyroid disease in black patients is treated based on these guidelines, there is a risk of inappropriately
aggressive treatment, oversuppression of parathyroid gland and development of adynamic bone disease. A recent study in a large population of US dialysis patients suggests increased mortality in those with relative hypoparathyroidism [7]. Therefore, it is important to define the spectrum of renal osteodystrophy in black dialysis patients as a function of the severity of parathyroid disease. Renal osteodystrophy is indeed an important problem in blacks, since the relative risk of hip fractures is increased three- to four-fold in the US Medicare dialysis population compared with the general population, irrespective of race [8]. Further studies are needed to define the histologic spectrum of renal osteodystrophy and optimal levels of parathryoid hormone in black patients with uraemia before the algorithms can be applied to this patient population.

Furthermore, the expert group recommends that bone alkaline phosphatase (AP) may be measured when total AP is elevated. In uraemic patients, bone AP is often elevated even when total AP is within the normal range. In any individual patient total AP has limitations in predicting bone AP because of the large individual variation in liver fraction. Therefore, the initial assessment of renal osteodystrophy parameters should include both total AP and bone AP. Decisions about medical or surgical therapy should be based on bone AP and not total AP. However, total AP may be more cost effective in monitoring the response to therapy over time in an individual patient.

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