Possible Relation between RBC Protoporphyrin and Aluminum Intoxication?

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Dear Sir,

We read with interest the recent report by Moreb et al. [1] on the evaluation of iron status in patients on intermittent hemodialysis. The authors found an abnormal increase in erythrocyte protoporphyrin (EPP) in uremic patients. In these patients, EPP was not negatively correlated with serum ferritin, in contrast to the relation observed in iron-deficiency non-uremic patients. Instead, a positive hitherto undescribed relation between both variables was found, at least when excluding patients with serum ferritin below 20 µg/l. The authors then point out that in their patients EPP was not useful in identifying increased or reduced iron stores and that known causes of increased EPP, apart from iron deficiency, include lead poisoning and erythropoietic protoporphyria. However, they do not incriminate any pathogenetic mechanism for the increased EPP in uremic patients.

We would like to propose a tentative mechanism which could explain the augmentation of EPP that is observed in uremic patients on dialysis but also on conservative treatment, and which the authors did not mention, i.e., aluminum intoxication. In recent years, several groups including ourselves [2–4] have reported the occurrence of a microcytic anemia in uremic patients and animals that was not iron-deficient, but rather due to heavy aluminum overload. Moreover, aluminum has been shown to decrease the activities of at least two enzymes involved in hemoglobin synthesis, i.e., δ-ami-nolevulinic acid dehydratase [5] and ferroxidase [6] and could thus also induce an increase in EPP. The authors could test our hypothesis by trying to establish a relation between EPP and plasma aluminum levels. If no such simple correlation exists, one could still expect to find

one with either the increase in plasma aluminum after desferrioxamine infusion as an indirect means of evaluating tissue aluminum burden, or directly with some tissue aluminum determination which would of course be more difficult to obtain.

References

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