Editorial

COPPER SUPPLEMENTATION IN TREATMENT OF ZINC DEFICIENCY DISEASES

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A long series of diseases are already known to result from zinc deficiency of which parakeratosis (in swine) was first to be recognized (1,28). Dwarfizm-hypogonadism-anemia (22), acrodermatitis enteropathica (20,29), severe trauma and injury (3), iron deficiency and geophagia (2), pregnancy (15), acquired immunodeficiency (5, 16, 21, 23), prolonged parenteral nutrition (14), carcinomatosis (19,26), cirrhosis (11), senile osteoporosis (4), anemia and neutropenia (13) are but a few of a long list (17,18,24). To these we added several allergic ailments and diseases of unknown aetiology ranging from giant urticaria to aphtous stomatitis through exema and alopecia (8,25). It is interesting that oral administration of zinc leads to a dramatic improvement in many of these pathological conditions (6,7,9). And yet some unsuccessful experiences of this endeavour have been recorded in the literature (12,23). Evaluating these in a preliminary series of cases we arrived at the conclusion that the failures could be because of unduly low dose of zinc or poor absorption from the gastrointestinal system. In order to detect which one of these possibilities may be correct we monitored the blood levels of this trace element periodically. After many trials we became quite successful in maintaining the serum level of this trace element between 9-120 μg/dl with simultaneous disappearance of the disease symptoms. It is interesting however that despite this restoration to normalcy, recurrence of complaints of the patients in a short period of time was almost unpeventable. The cause of this was uncovered when we reviewed their serum copper levels (7,9). It was then observed that in these patients the levels of serum copper, contrary to that of zinc, was lowered as the later increased (7,9) following institution of zinc therapy. Assuming that the return of the complaints of the patients despite normozincaemia could have been secondary to reduced copper levels we administered appropriate doses (7) of (Copper sulfate, $5H_2O$). Utilizing the same approach of frequent measurements we soon became able to maintain copper levels also within normal range, and the ratio of zinc/copper near unity. The noteworthy fact is that this correlated with disappearance of complaints of the patients (7,9).

The possibility of provocation of classical copper toxicity was seriously considered and its signs and symptoms were carefully scrutinized (6,7,10,27). Luckily we have never encountered this in any of our series over 2000 cases simply because we maintained zinc/copper ratio normal by giving small daily doses of ($CuSO_4$. $5H_2O$) orally (9). It is also possible that simultaneous ingestion of zinc may have played a preventive effect on development of copper intoxication (10,27). It has been demonstrated that even the accumulation of copper in the liver is significantly reduced when zinc was administered simultaneously (10).

In conclusion it should be stressed that in adults zinc should not be solely administered to humans in cases of hypozyncaemia. It is perhaps, because zinc deficiency is not the whole character of the disease but it most likely involves alterations of copper metabolism also (6,9-11, 18,23). It is natural therefore that unless zinc and copper are both given simultaneously except in cases where hypercupremia is observed, the disease will not be cured.

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