

is associated with copper deficiency, and patients have been identified with acquired copper deficiency of unknown etiology and increased serum zinc in the absence of exogenous zinc ingestion. These findings remind us that we have much to learn about the interplay of copper and zinc homeostasis and suggest that the resulting copper deficiency is likely more complex than the proposed interference with gastrointestinal tract absorption.

In the final analysis, case reports of rare diseases sharpen our diagnostic skills and reveal the hidden

mysteries that remain to be explored in much of human physiology and disease.

Commentary

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This clinical case study is timely and interesting. A recent TV advertisement from a law firm aired in Utah and targeted victims who might have been harmed by zinc-containing denture adhesives. An Internet search on zinc toxicity identified 2 law firms that handle these cases and an advertisement for a zinc-free denture adhesive. Zinc toxicity may have causes other than excessive use of zinc-containing denture adhesives. Pennies minted in the US since 1983 contain 97.5% zinc. Zinc is highly reactive with gastric acid. Ingestion can cause local corrosion and systemic toxicity. Massive ingestion can be fatal (1). Acute toxicity has resulted from storage of food or drink in galvanized containers. Toxicity due to ingestion of very large doses of zinc remains quite uncommon (2). Pharmacologic intake of zinc (100–300 mg Zn/day) over a long period can lead to severe copper deficiency, like that described in this clinical case study. Ingestion of between the Recommended Daily Allowance of 15 mg/day and pharmacologic doses of 100 mg/day has been associated with adverse consequences (2). Excessive absorption of zinc can also suppress iron absorption (2).

Zinc is an essential cofactor in a number of cellular processes. A review of the literature on zinc and human health demonstrates that dietary zinc deficiency is a major health problem worldwide, with nearly 2×10^9 people affected (3). Zinc deficiency is particularly problematic in infancy, with nearly 1×10^6 excess

deaths due to pneumonia, diarrhea, and malaria occurring worldwide annually in children under 5 years. Adequate intake from foods can be difficult without fortification. Fortification programs are difficult to implement for the rural poor of less-developed countries. Obtaining an adequate intake of zinc in children is a major challenge worldwide, in contrast with the excessive intake from supplements and zinc-containing products in developed countries.

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