pubic bones proved to be beneficial and the diagnosis of osteomyelitis readily became apparent.

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HYPOZINCEMIA, AGEUSIA, DYSOSMIA, AND TOILET TISSUE PICA

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A 37-year-old female presented with complaints of ageusia, dysosmia, fatigue, and toilet tissue pica. She was found to have hypozincemia and iron deficiency anemia. Her complaints quickly abated when treated with oral zinc and iron.

The literature and standard textbooks[1-3] abound with information relating to iron deficiency and need not be discussed in this report. However, of the many symptoms that accompany iron deficiency, it is interesting to note that pica for bizarre substances, such as starch, ice, and clay occasionally occurs. For unknown reasons these forms of pica seem to be more common in black females.[4] Medical knowledge regarding zinc and zinc metabolism in man is slight and still forthcoming. Until recently the importance of zinc and other trace elements has received little clinical attention.[5-6]

The following case report describes a patient with combined iron deficiency and hypozincemia. It is felt her fatigue and her unusually bizarre craving, specifically for toilet tissue, were due to iron deficiency. Disturbed taste and smell senses paralleling her hypozincemia were thought to be a manifestation of zinc deficiency.

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CASE REPORT

A 37-year-old black woman was referred for evaluation of disturbed smell and loss of taste for over one year. These were associated with chronic fatigue and listlessness. During this same period of time, she rather embarrassedly admitted to an overwhelming desire to eat toilet tissue. Frequently, she would awaken at night and dash to her bathroom to eat toilet tissue. No other type(s) of pica were admitted. In addition, she gave a long history of menorrhagia and frequently passed vaginal blood clots during her menses. Her libido was normal and there was no history of poor wound healing, skin or mucous membrane lesions, or intestinal symptoms. Her dietary history suggested a high carbohydrate diet, and due to a mild exogenous obesity she intermittently resorted to a vegan-like diet that included beans and various seeds.

Pertinent laboratory studies revealed a pretreatment hematocrit level of 33.5 percent, hemoglobin level of 11.4 gm/100 ml, red blood cell count of 3.79 million, mean cell volume of 88 μ^3, mean corpuscular hemoglobin of 29.9 $\mu\mu$g, mean corpuscular hemoglobin count of 33.7%, serum iron level of 37 μg/100 ml (45-200), and serum zinc 28 μg/100 ml (50-160).

She was treated with elemental zinc 24 mg bid and ferrous sulfate 300 mg tid by mouth. Within one week, her taste and smell had returned, and both her sense of well being and energy level had improved. Her serum zinc level was 95 μg/dl.

One month following treatment, she was asymptomatic and repeat laboratory studies revealed hematocrit of 39.4%, reticulocytes 4%, hemoglobin 13 gm/dl, red blood cell count 4.25 million, mean corpuscular volume 93 μ^3, mean corpuscular hemoglobin 30.8 μμg, mean corpuscular hemoglobin count 33.2%, and serum zine 111 μg/100 ml. Two months later her serum zinc level was 117 μg/100 ml and serum iron 133 μg/100 ml. She was asymptomatic and has remained so to this writing.

DISCUSSION

Zinc is the most abundant of the trace metals found in the human body. Despite this fact, there is as yet no specific test for zinc deficiency. Zinc balance studies, available only at research level, are needed to properly evaluate the importance of a low serum zinc. Serum or plasma zinc levels for normal subjects have been reported.[6]

In general, zinc and other trace elemental deficiencies can result from inadequate dietary intake (generalized malnutrition, low protein-high carbohydrate diets),[6] impaired intestinal absorption (malabsorption syndromes, short bowel syndrome, Zollinger-Ellison syndrome), excessive excretion (sweating, renal wasting), decreased plasma binding, increased utilization or redistribution (jogging, long distance running),[6] and certain disease states (bronchogenic and pancreatic carcinomas).[6,7] Recently a zinc deficiency syndrome has been reported following total parenteral nutrition,[8] and characterized by moist eczematoid dermatitis, parakeratosis with diarrhea, and alopecia.

Other clinical disorders in man attributed to chronic zinc deficiency include growth retardation (dwarfism),[9] loss of smell and taste acuity, anorexia, geophagia,[10-11] and impaired wound healing.[12] Acrodermatitis enterohepathica, a lethal, inherited, zinc-deficiency disorder, has been reported.[13-14]

The recommended daily allowance of zinc for adults is 15 mg. Proteins are the major source of zinc in the diet. Although vegetables contain zinc, vegans should be made aware that zinc from plant sources is not readily absorbed because naturally occurring phytates, particularly high in beans and seeds, reduce zinc gastrointestinal absorption. Carbohydrates are very poor sources of zinc.[6-15]

Chronic iron deficiency secondary to chronic menorrhagia accounts well for the anemia, fatigue, and unusual pica for toilet tissue noted in this patient. The most reasonable explanation for her ageusia and dysosmia is chronic mild zinc deficiency which one can only speculate resulted from chronic poor dietary intake and/or phytate impaired gastrointestinal absorption of elemental zinc.

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