Acrodermatitis enteropathica Like Syndrome in a Dialysis Patient

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Dear Sir,

Acrodermatitis enteropathica is a lethal, autosomal-recessive disorder, which usually occurs in infants. Although it is not present at birth, it typically develops in the early months of life, soon after weaning from breast-feeding. It is provoked by a specific zinc absorption deficiency which produces low serum zinc levels. The molecular basis of zinc malabsorption remains unknown. Der-matological manifestations represent the main clinical signs and include progressive bullous-pustular dermatitis of the extremities and the oral, anal and genital areas, combined with paronychia and general alopecia. Candida albicans infection represents a frequent complication of this disease. Ophthalmic signs may include blepharitis, conjunctivitis, photophobia, and corneal opacities. Gastrointestinal disturbances are usually severe, including chronic diarrhea, malabsorption, steatorrhea, and lactose intolerance. Finally, neuropsychiatric signs include irritability, emotional disorders, tremor, and occasional cerebellar ataxia. Zinc supplementation resolves complete cure of the skin lesions. Other causes of zinc depletion are severe malnutrition, malabsorption, treatment with massive doses of chelating agents and extensive burns. Some of these zinc depletion syndromes have been associated with clinical manifestations similar to acrodermatitis enteropathica, and the entity was named acrodermatitis enteropathica-like syndrome [1].

It is well documented that patients with chronic renal failure on maintenance dialysis have low concentrations of zinc in plasma, leukocytes, and hair. Although this zinc deficiency usually remains asymptomatic, uremic hypogeusia and gonadal hypofunction were noted to resolve following zinc supplementation and elevation of plasma zinc concentrations [2, 3]. The presence of an acrodermatitis enteropathica-like syndrome has not been reported in a dialysis patient until now.

We report a 63-year-old woman with chronic renal failure and on hemodialysis for a long period, who developed lesions characteristic of acrodermatitis enteropathica-like syndrome after a chronic diarrhea process.

A 63-year-old woman with chronic renal failure secondary to interstitial nephritis, on dialysis treatment for the last 16 years. She had developed several complications associated with

dialysis status, such as secondary hyperparathyroidism, β 2-microglobulin amyloidosis, and two failed cadaveric renal transplantations.

Two months before admission, the patient suffered a chronic and prolonged gastroenteritis process with nausea, vomiting and watery diarrhea. No etiological evidence could be identified. At the end of these symptoms, she developed skin lesions characterized by progressive and diffuse thinning of the scalp hair, stomatitis, bilateral blepharitis, conjunctivitis, eczematous eruption of the forearms, legs and anogenital region with severe itching. Moreover, she reported mental depression.

Laboratory investigations disclosed normal levels of glucose, uric acid, cholesterol, triglycerides, ALAT, ASAT and bilirubin. Sodium, potassium, calcium, phosphorus and PTHi were within normal ranges, and phosphatase alkaline 406 IU/l ($n < 280$ IU/l). Red blood cells $4.04 \times 10^6/\text{cm}^3$, hemoglobin 11.5 g/dl, MCV 90, MCH 28.4 fl, white blood cell count and platelets were also normal. Serum concentration of zinc was 47 $\mu\text{g/dl}$ ($n = 70\text{--}120$ $\mu\text{g/dl}$), determined by Atomic Absorption Spectrophotometry using a Perkin-Elmer 1.100 B instrument. Oral therapy with zinc sulfate was started (25 mg/8 h) with capsules prepared by the hospital pharmacy and 10 days later skin lesions improved markedly and serum zinc level increased to 76 $\mu\text{g/dl}$. However, a mistake in the preparation of the zinc sulfate capsules was made by a community pharmacy, instead of 25 mg per capsule they prepared capsules of 5 mg. Two weeks after initiating this low-dose treatment, skin and mucosal lesions recurred and the zinc level dropped to 56 $\mu\text{g/dl}$. Then, a new treatment with zinc sulfate (50 mg/8 h) was prescribed, resulting in quick improvement of the skin and mucosal lesions (fig. 1). Five months later, skin and mucosal lesions have disappeared completely, mental status was normal and zinc serum levels were within the normal range.

Zinc belongs to the group of essential trace elements, the principal biologic role of which is a component of metalloenzymes such as carbonic anhydrase and alkaline phosphatase. Zinc is indispensable for the normal function of all types of cells, cellular systems, tissues and organs in the human body. The essentiality is mainly related to its function as a metal moiety of important enzymes such as alkaline phosphatase, alcohol dehydrogenase related to retinol metabo-

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0028-2766/95/0703-0389

\$8.00/0

lism, and several other dehydrogenases and digestive enzymes. Zinc also regulates DNA and RNA polymerases, thymidine kinase and ribonucleases. The wide distribution of zinc metalloenzymes is reflected by the wide variety of symptoms, dysgeusia, reduced sexual function, acrodermatitis enteropathica, poor wound healing, anemia and reduced cellular immunity, all of which have been ascribed to zinc deficiency [4, 5]. There is general consensus that the mean plasma zinc levels are low in chronic renal failure and during maintenance dialysis. Tissue zinc levels have been measured and were also low. The origin is not completely clear. No evidence of dietary zinc depletion, impaired zinc absorption or enhanced zinc elimination were identified [2]. Mahajan et al. [6] have found inappropriately high fecal zinc excretion in the presence of low dietary zinc intake in uremia.

Acrodermatitis enteropathica-like syndrome is usually suspected by the clinical background, physical examination, and low serum zinc levels. Confirmation is mandatory by clinical and

laboratory improvement after 4 or 5 days of zinc therapy [1]. In our patient there is a clear relationship between serum zinc levels and the evolution of skin lesions, especially after the recurrence of skin lesions during the low dose of zinc therapy. Adequate therapy was oral zinc sulfate about 2 mg/kg given 2-3 times a day. In severe cases, zinc should be given parenterally.

■ Plasma zinc level ESU Zinc dose

300 250 200 150 100 50 N

150 100 50 N

100 50 N

50 N

N

Skin lesions

0

98

23 37 51 Time (days)

Fig. 1. Evolution of plasma zinc level, zinc dose and skin lesions.

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