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Dental considerations in acrodermatitis enteropathica: A report of two cases

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Case Report

Abstract

BACKGROUND AND AIM: Acrodermatitis enteropathica (AE) is a rare and severe genetic disorder with autosomal recessive inheritance, which is usually diagnosed with deficiency of zinc intestinal absorption. This disease is classified into hereditary and acquired forms that the hereditary form is much rare. AE can be characterized by triad of periorificial and acral dermatitis, alopecia, and diarrhea. The present study aimed to report the dentistry treatment of two boys with hereditary AE and special considerations about this disease.

CASE REPORT: Patients included two brothers aged 6 and 8 years with AE, and they were examined at a health center. Three days after the birth, the erythematous, erosive, and crusted lesions were seen on their mouths, perianal areas, feet, and hands. The serum zinc levels were normal. The preventive treatment like fissure sealant on four first permanent molars was performed on the 8-year-old patient, and for the other patient, two mandibular deciduous anterior teeth were extracted.

CONCLUSION: AE is a rare genetic disease which can be along with dental anomaly and oral infections. Despite the fact that there are cases with normal serum, the clinical and radiographical examinations will be helpful for the final diagnosis. This study presented two male siblings with normal zinc serum who demonstrated hair and skin lesions without dental disorders.

KEYWORDS: Acrodermatitis Enteropathica; Oral Manifestations; Child; Case Reports

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Acrodermatitis enteropathica (AE) is a rare congenital metabolic disease with autosomal recessive inheritance which can lead to the severe zinc deficiency in the blood serum. Its inherited form can be seen in 1500000 people.[1,2] Males and females are equally affected by this disease.[3] Serum zinc deficiency is due to intestinal zinc malabsorption and may be related to the mutation in solute carrier family 39 member 4 (SLC39A4) that codes zinc transporter (ZIP4) protein.[4] The missing protein is responsible for decreasing the zinc uptake and abnormal zinc metabolism.[5]

AE can be characterized by the triad of periorificial and acral symmetrical dermatitis, alopecia (hair loss), and diarrhea. Paronychia, angular cheilitis (AC), and glossitis can be also seen.[6] More progressive clinical manifestations in non-treated cases include the delayed growth, delayed puberty, anemia, anorexia, and difficult wound healing.[5]

The skin around orifice such as mouth, anus, and the skin on elbows, knees, hands, and feet can be inflamed. Skin lesions are usually vesiculobullous, and then dry and become psoriasis-like. Around of nails can be also involved, and this abnormality may be due to the zinc deficiency. Hair loss of head, eyelid, and eyebrows may be also occurred (alopecia). The membrane inflammation on eyelid (conjunctivitis) is also common.[7]

Zinc is an imperative component of growth and the immune system, and its normal serum level is 85-160 µg/dl. The

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serum level less than 83 µg/dl refers to the zinc deficiency. The gold standard laboratory test can diagnose the plasma zinc deficiency; however, it may show normal serum concentrations even in the case of tissue depletion. For this respect, the dosage of alkaline phosphatase (ALP) can be helpful because ALP is a zinc-dependent enzyme that responds to its replacement by increasing the initial low serum levels.[5]

Moreover, some diseases should be considered for the differential diagnosis of AE, like kwashiorkor, acquired immunodeficiency syndrome (AIDS), glutaric aciduria type 1 (GA1), prematurity, malabsorption syndromes secondary to cystic fibrosis or intestinal diseases, atypical epidermolysis bullosa (EB), and leucinosis. The proper diagnosis will be distinguished by plasma zinc level.[7]

Zinc is also a crucial element in the mineralization of enamel after the eruption of teeth, whereas decreases the susceptibility of caries. Animal studies suggested that zinc deficiency was a potential risk factor for oral and periodontal disease.[8] In another study, it was reported that aphthous ulcers were more prominent in a zinc deficiency group. Furthermore, the zinc deficiency contributed to the high susceptibility to bacterial and fungal infections like candidiasis.[9] Kelly et al. observed AE with peripheral edema, glossitis, and cheilitis.[6] Sutton and Newin noted that these lesions were annular, crusted, and in advanced disease erosive. Secondary infections by candida albicans or staphylococcus aureus may worsen these conditions.[2] The present study aimed to report two dental patients with AE in them skin lesions were manifested in a similar way to other patients with this skin disorder, but showed no oral lesion or infection.

Case Report

Patients were two brothers, 6 and 8 years of age, referring to the health center of Feiz Abad City, Iran. The six-year-old patient had a chief complaint of improper eruption of permanent mandibular incisors because of over-retained deciduous anterior teeth. According to parents' history, the clinical manifestation of AE was seen three days after birth as erythematous and crusted lesions on periorificial areas, hands, feet, and neck. The laboratory tests including zinc and ALP serum levels and also skin biopsy were then performed. Their normal zinc serum levels were 86 µg/dl and 89 µg/dl, respectively. Also, ALP was < 350 U/L. Oral zinc therapy was prescribed, but no healing was observed. In the clinical examination, skin lesions included the erosive and crusted ones and were more seen around their mouths, hands, and feet. In the oral examination, the soft tissue had no ulcer and candidiasis, and the hard tissue was also normal without any dental anomaly or enamel disorder.

For the 6-year-old child, two over-retained teeth were extracted after local anesthesia in buccal vestibule and lingual papilla (lidocaine 2%, epinephrine 1:80000). Sterile bandage was slightly pressed on sockets for 5 minutes. After this period, no excess bleeding occurred and the clot formed. (Figure 1, A-G). The older patient had no delay in the eruption of six anterior teeth in both jaws (Figure 2, A and B).

In the radiographic assessment, there was no observed missing or dental anomaly like enamel/dentin hypoplasia or any problem in the eruption (Figure 2, C and D).

For the 8-year-old patient, dental prophylaxis with rubber cap and pumice powder was performed to professionally remove the dental plaque. The pit and fissures of first permanent molars were then sealed in 4 quadrants without any injection (Figure 2, E).

Oral opening was our limitation for these patients at dentistry procedures because of the crusted lesions of periorificial and the difficulty in the intercommunication. To overcome this limitation, the dentist should utilize the body language, tell, show, do, and spend more chair time to decrease the patients' worries and phobia. Preventive treatment should be prescribed with regular follow-up.

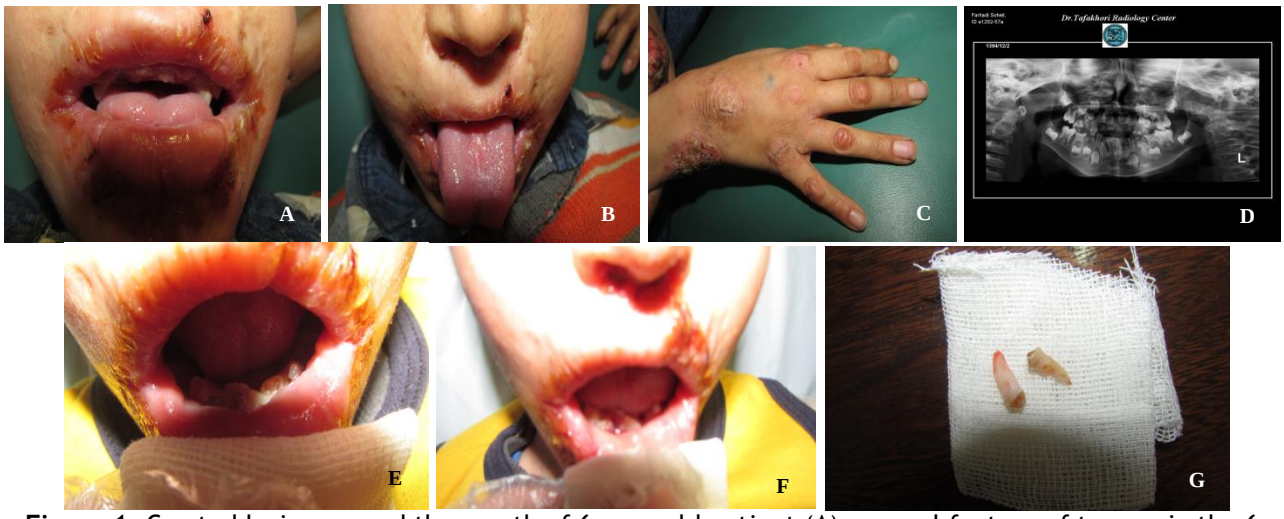

Figure 1. Crusted lesion around the mouth of 6-year-old patient (A), normal feature of tongue in the 6-year-old patient (B), erythematous scaly plaques on hands of the 6-year-old patient (psoriasis-like form) (C), panoramic radiography of the 6-year-old patient (D), over-retained primary incisors (71 and 81) (E), after extraction (5 minutes later) (F), extracted teeth (G)

Discussion

AE is a congenital recessive autosomal disease characterized by skin lesions around body orifices like mouth and anus, and also with alopecia and diarrhea.[10]

For differential diagnosis of congenital AE, it is necessary to rule out zinc deficiency of other etiologies like inadequate zinc stocks due to the premature birth, poor absorption in cystic fibrosis or small intestine resection, and EB.[5]

The skin lesions in AE are erythematous and vesiculobullous and can evolve into dry, scaly, and crusted lesions like psoriasis.[11] Lesions around orifices are dominant and may be secondarily infected with staphylococcus aureus or Candida albicans.[3] They are often around the mouth, red and inflamed patches and can become crusted, pussy, and erosive lesions. There is often a sharp demarcation line between the normal and affected area.[2]

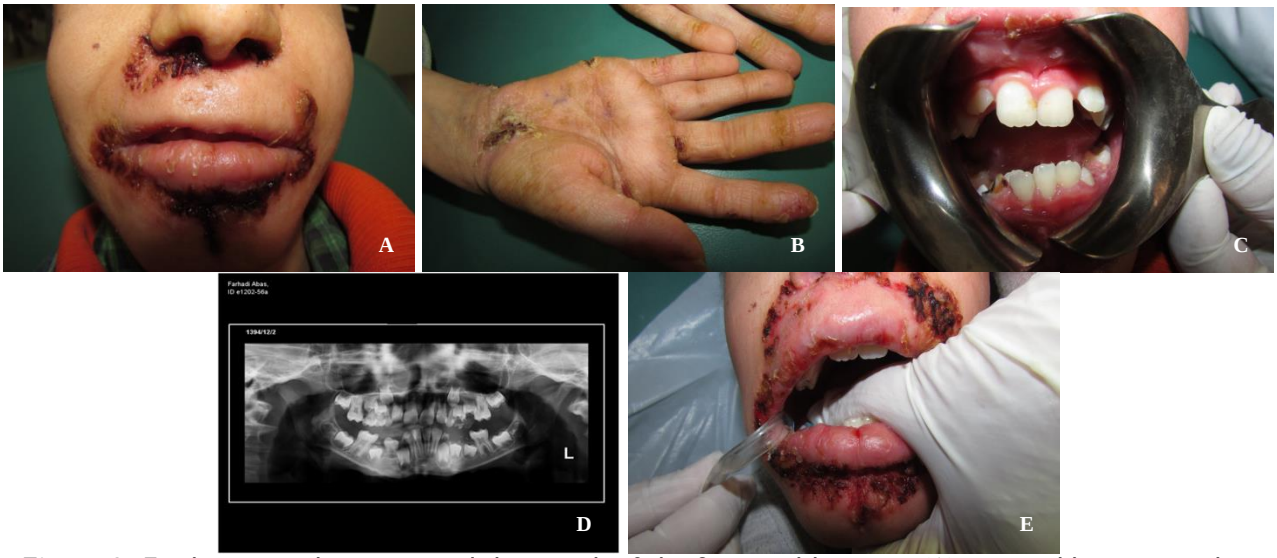

Figure 2. Erythematous lesion around the mouth of the 8-year-old patient (A), crusted lesion on palms (B), normal permanent anterior teeth in mixed dentition in older patient (C), panoramic radiography of the 8-year-old patient (D), etching stage in fissure-sealant therapy (E)

The oral mucosa can be shown glossitis and also angular cheilitis. Anemia, anorexia, paronychia, conjunctivitis, sensitivity to light, depression, delayed growth, and recurrent infections were usually observed in the older children.[12]

The histological findings are not specialized for AE. Furthermore, the lesions are varied in different ages. Initial lesions show parakeratosis as the result of reduced granular layer, but psoriasis-like epidermal hyperplasia is reported in late lesions.[3]

Zinc deficiency could occur when zinc is released from blood to vicinity microenvironment, where the actual site of zinc biologic actions are impaired; even when the serum zinc level is normal, if the albumin-bound form of zinc is low, actual zinc deficiency can occur. Diagnosis of AE is primarily made by clinical manifestation and lower zinc level. Although, if the plasma zinc level was normal, with characteristic clinical features and good response to zinc supplementation, the diagnosis could be established.[13]

Zinc deficiency can be related to conditions relating to the immune system like aphthous ulcers. Khademi and Shaikhiany reported that serum zinc level was significantly lower than normal level in patients with recurrent aphthous stomatitis (RAS).[14]

In an animal study, Seyedmajidi et al. found that there was a statistical significant difference in gingival index between zinc deficiency group and zinc normal group. The authors also reported that hyperkeratosis could be more prominent among the papillae on dorsal surface of tongue;[8] whereas Orbak et al. reported this hyperkeratinization on the dorsal surface of tongue.[9]

Nistor et al. noted that in children with watery diarrhea, secondary bacterial infections (Gram-positive, sometimes Gram-negative) or candidiasis (especially Candida albicans) were common and they can modify the clinical picture of diease.[10]

Normal level of serum zinc is 85-160 µg/dl. It is worth noting that normal levels of serum zinc were observed in 30% of cases that could not rule out AE.[5] One to three mg/kg/day of zinc was recommended for treatment of AE.[11] The zinc level should be checked every 3-6 months after prescription of oral zinc for adjusting the required dose.[15] High doses for a long time may lead to the copper deficiency, dizziness, and gastrointestinal (GI) symptoms. The antibiotic therapy is necessary if the recurrent bacterial and/or fungal infection occurs.[2]

In the patients of the present study, the serum zinc levels ranged from 85 µg/dl to 96 µg/dl, but the zinc absorption from intestine was insufficient. Zinc deficiency may occur in fulminant candida infection (in people with weak immune system) or dental deformity.[16] Tooth is an organ with epidermal origin, like mucosa or skin. In both brothers, there were skin lesions and recurrent cold sores indicating the skin involvement and weak immune systems, but fortunately, no dental deformity or oral fungal/bacterial infection like candidiasis was observed. In patients with AE, we should notice more to preventive strategies like applying fluoride varnish, seal pits and fissures, enhancement of oral health through indicating chemical plaque control by mouth rinses like chlorohexidine due to the opening mouth limitation for toothbrushing, and arranging recall appointment to stop any initial caries as soon as possible.

Conclusion

The cases emphasized on an open mind for different treatment plans for patients with AE. Clinicians should think about special consideration of these patients in application of preventive and treatment procedures. A pedodontist should also reduce the patient anxiety by behavior management techniques. In the first dentistry visit, managing the discomfort of mouth opening could result in the better treatment of patients.

Conflict of Interests

Authors have no conflict of interest.

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