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CASE REPORT

Scurvy diagnosis due to gingival alterations: Case report

Bruna Ferreira de Lima [1]
Thais Oliveira da Luz [1]
João Roig Martins [1]
Natália Batista Daroit [1]*

Abstract:

Introduction: Scurvy is a disease resulting from a severe vitamin C deficiency, and its diagnosis is often challenging owing to nonspecific symptoms. **Objective:** encouraging dentists to reflect on systemic causes that may influence the oral manifestations of diseases. Emphasize that despite a disease from the last century, today you can still find vitamin deficiencies, and report of a case of Scurvy with gingival alterations. **Case Report:** A 30-year-old female patient sought dental care because she experienced sensitivity in her gums and bleeding. Intraoral examination revealed a slightly swollen gingiva which was erythematous, with friable consistency, and bled upon probing. Diseases such as anemia, hypovitaminosis, and AIDS, were considered within the diagnostic hypothesis of gingivitis. After hematological investigation, a very low level of vitamin C was detected, and scurvy was diagnosed. Vitamin C supplementation was then initiated in addition to the control of oral hygiene. After four months, clinical improvement was observed. **Conclusion:** Although there are few cases in the literature, oral surgeons must be aware of oral alterations associated with scurvy. The search for local and systemic etiological factors is important because changes in general health have a direct impact on oral tissues.

Keywords: Scurvy; Gingivitis; Ascorbic acid Deficiency; Avitaminosis; Oral Manifestations.

[1] Atitus Educação, Dental School - Porto Alegre - Rio Grande do Sul - Brasil.

Correspondence to:
Natália Batista Daroit.
E-mail: nataliadaroit@yahoo.com.br

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INTRODUCTION

Vitamins are essential organic compounds for the maintenance of the human body and help in cellular metabolism, favoring chemical reactions that allow the absorption of nutrients[1]. Adequate availability of nutritional substances is critical to the development, growth, maintenance, and repair of an individual's health[2].

Ascorbic acid (vitamin C) has an antioxidative role, aiding in collagen synthesis, in addition to acting as a cofactor for other enzymes in the human body[3,4]. Plasma and tissue concentrations of this vitamin depend on the amount consumed, bioavailability, renal excretion, and metabolization.

Scurvy is a disease resulting from a severe shortage of vitamin C intake and its diagnosis, which is often challenging due to the rarity of this condition and nonspecific symptoms, occurs through the evaluation of serum vitamin C levels[5,6].

The available evidence shows that vitamin C deficiency has significantly decreased in the population; however, studies carried out in North America and Europe still show a prevalence ranging from 3% to 25.3%[7,8]. Scurvy is probably underdiagnosed, although it presents manifestations relevant to several medical specialties, including dentistry[9].

Although a causal relationship between vitamin C deficiency and the incidence of periodontal disease has never been scientifically proven, patients with periodontal disease may have decreased systemic levels of vitamin C compared to healthy individuals, suggesting that this deficiency may contribute to the severity of periodontal disease and diseases of the supporting tissues of the teeth (without necessarily being the primary cause), since ascorbic acid is important for collagen formation and periodontal regeneration[10].

Gingivitis is an inflammatory disease caused by specific oral microorganisms that progress through a host response and may progress to periodontitis, resulting in loss of attachment supporting periodontal ligament and alveolar bone[11]. Although gingival bleeding is a clinical sign of both scurvy and periodontal disease, these conditions differs due to different pathogens[12]. In scurvy, gingival changes are caused by a deficiency in collagen synthesis, resulting in blood vessels fragility, and dental plaque bacteria, which may be associated with host susceptibility, generating an inflammatory process in the tissues[13,14].

Therefore, it is necessary for dental surgeons to understand the impact of scurvy on periodontal health and to diagnose this condition. This report describes a case of scurvy with oral manifestations.

CASE REPORT

A 30-year-old female patient, who was a lawyer and student for public tenders, sought dental care in a private clinic with the chief complaint of generalized painful symptoms in the gingiva. In the anamnesis, the patient reported that she "felt her gums were sensitive and bled every time she flossed". The intraoral physical examination revealed a slightly swollen, friable, erythematous, and bleeding gingiva upon probing, with a visible plaque index of 9% and a gingival bleeding index of 45% (Figure 1). Initially, dental prophylaxis and oral hygiene guidance were performed, and panoramic radiography was requested (Figure 2). After 14 days of consultation, the periodontal indices remained unchanged, and the complaint of painful symptoms had not regressed. Panoramic radiography showed a bone crest height within the normal range, excluding bone resorption and periodontitis. Within the diagnostic hypotheses, in addition to gingivitis, systemic diseases such as anemia, hypovitaminosis, and immunosuppression (AIDS) were considered. Additional hematological tests were performed (Table 1).

Figure 1. Initial appearance of the slightly swollen, erythematous gingiva, with a friable consistency.

The hematological tests detected a low level of vitamin C, diagnosing Scurvy. At that moment, the patient reported that she felt tired and weak from her daily activities. The patient was referred to a nutritionist to investigate the causes of this systemic alteration. The initial treatment was through supplementation with 1g of vitamin C per day for 30 days. After treatment, a new Vitamin C level test

Figure 2. Radiographic Aspect. Panoramic radiography absence of alveolar bone loss.

Table 1. Hematological tests results.

	Results	Reference Values
Iron	76ug/dL	60 a 160
Erythrocytes	4,72 millions/mm^2	3,80 a 4,80
Hemoglobin	13,4 g/dL	12,0 a 15,0
Hematocrit	42%	36 a 46%
Leukocytes	8530/mm^2	4000 a 10.000
Platelets	272.000/mm^2	140.000 a 450.000
Vitamin B12	417,0 pg/Ml	> 250
Vitamin C	**< 0,5 mg/L**	4,6 a 15 mg/dL
Anti HIV 1 and 2	Not reagent	Not reagent

was requested to verify if there was any change in the systemic concentration of ascorbic acid, which returned to normal levels (12.9 mg/L). There was a decrease in painful symptoms, even with gingival plaque control and strict oral hygiene, the patient still felt slight discomfort and the gingiva had slight erythema. After two months of the initial treatment, she again underwent tests for the dosage of Vitamin C, which showed deficiency (4.2 mg / L). The patient started supplementation with 1g of vitamin C daily and after four months of the initial diagnosis, she reported significant improvement in symptoms and her gingiva no longer showed clinical signs of edema, bleeding, and/or erythema (Figure 3).

Figure 3. final clinical aspect after Vitamin C supplementation and periodontal treatment. A) Right View. B) Frontal View. C) Left View.

DISCUSSION

Scurvy is considered a medieval disease, but it can be found currently mainly in low-income populations that do not have access to vitamin-rich foods[15]. This case report showed a case of Vitamin C deficiency diagnosis due to oral manifestations.

Currently, eating behavior plays a central role in disease prevention and treatment. In particular, students tend to have poor eating habits. A study by Bede et al. showed a high prevalence of malnutrition in the food profile of students. The study also showed that irregular meals; low consumption of fruits, vegetables, and milk; high consumption of sweets and fried foods; and alcohol intake are frequent dietary practices by these students[16]. Such habits were also reported by the patient, which may have led to the development of scurvy.

In the early stages of scurvy, nonspecific symptoms such as fatigue and prostration occur, which are conditions suggestive of other alterations, such as anemia. However, the major difference between these conditions is their pathogenesis. In anemia, the blood hemoglobin is below the values considered normal, without considering the cause of the deficiency, while in scurvy, there is a deficit of vitamin C in the body. It should be noted that the differential diagnosis between these two conditions is essential to establish the correct treatment[17].

Diagnosing scurvy is difficult because its signal/symptoms are similar to those of many conditions. Linear erythema is a pathology that affects HIV-infected patients, and its clinical manifestations appear as an erythematous band along the marginal gingiva, which may present as an erythematous halo that extends from the free to the attached gingiva. Therefore, this condition is not associated with accumulation of bacterial plaques and does not respond to conventional treatment. To perform differential diagnosis, complementary tests are necessary, one of which is to exclude HIV infection[18,19].

In the literature, there are cases of scurvy associated with severe systemic conditions, such as schizophrenia[20] or AIDS[21]. However, in all cases, vitamin deficiency was identified and defined as a determining factor for the development of scurvy. In the present case, the patient did not present with any alterations other than vitamin C deficiency.

In an experimental study carried out in humans in the United States of America, signs of scurvy began to appear approximately 40 days after interruption of vitamin C intake. Radiographically, no significant changes were observed. Patients who had a previous history of gingivitis had more pronounced lesions. Patients with healthy gums presented with milder conditions, and edentulous subjects did not present with symptoms[22, 23].

Capillary fragility due to vitamin C deficiency is a result of the impediment of collagen formation due to iron-dependent oxidative reactions that inactivate some enzymes necessary for collagen formation, resulting in edema and gingival erythema in the mouth[24]. Gingival tissues are composed of epithelial and connective tissues, with the latter being the most predominant. Collagen fiber comprise approximately 60% of the lamina dura, justifying the importance of vitamin C in the maintenance of periodontal health[25].

Tissue repair is coordinated by the stages of inflammation and tissue formation. Vitamin C deficiency delays this process as the body produces inflammatory and immune responses during the inflammatory process against an aggressive agent. As a result, there is an increase in the production of reactive oxygen species, disturbing the balance of the antioxidant system and its neutralizing capacity. This results in oxidative stress. Vitamin C has the ability to react with oxidizing species to transform them into less reactive molecules, preventing the accumulation of free radicals in the cell, justifying the reason for aggravation of cases of gingivitis and periodontitis when there is a lack of ascorbic acid[26].

There is classic confusion between scurvy and periodontal disease, as both conditions are related to gingival bleeding. However, it should be understood that although both conditions share similar clinical signs, from an etiopathogenic perspective, they are not related. Although some studies have attempted to show a causal relationship between vitamin C[27,28] the vast majority have failed to prove a true relationship between vitamin C levels and periodontal disease. Similarly, studies have shown that vitamin C supplementation in patients with periodontitis does not affect treatment, as the level of ascorbic acid is not a causative factor of periodontal disease[29,30].

Oral surgeons should be aware of cases similar to ours, as there are few cases in the literature reporting oral alterations associated with scurvy. Understanding the etiopathogenesis of the condition is extremely important to correctly diagnose and consequently determine the appropriate treatment, taking into account local and systemic etiological factors, since changes in general health directly affect the oral tissues.

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