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Pediatric Scurvy in 21st Century: Oral and Systemic Manifestations in Two Patients: Case Report

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ABSTRACT: Scurvy is an uncommon nutritional disorder caused by prolonged vitamin C deficiency. Its diverse clinical manifestations may resemble hematological and other systemic diseases, potentially delaying diagnosis. Oral findings can provide important clues for early recognition. We report two cases of scurvy with distinct clinical presentations. A 9-year-old child presented with gingival bleeding, perifollicular hemorrhages and inability to walk. Hematological malignancy was initially suspected but subsequently excluded. Following oral and maxillofacial evaluation, scurvy was clinically diagnosed, and nutritional management was inititated. Clinical improvement was observed within five days of vitamin C supplementation. The second patient, a 17-year-old adolescent with autism, presented with gingival enlargement, weakness, and severe anemia. Hemoglobin increased from 6.7 to 11.2 g/dL following blood transfusion. Normal hemostatic findings and subsequent multidisciplinary assessment supported a clinical diagnosis of scurvy. Management included vitamin C supplementation and treatment of epistaxis. Scurvy should be considered in children presenting with unexplained gingival abnormalities accompanied by systemic manifestations. A dietary history, careful clinical examination, and multidisciplinary collaboration are essential for timely diagnosis and appropriate management.

KEYWORDS: gingival bleeding; oral manifestations; scurvy; vitamin C deficiency

I. INTRODUCTION

Scurvy is a pathological condition arising from prolonged ascorbic acid deficiency. Since the human body are incapable of synthesizing vitamin C due to the absence of the enzyme L-gulonolactone oxidase, an adequate dietary intake is essential to maintain normal physiological functions. Vitamin C plays an important role in several biological processes, particularly collagen synthesis, bone formation, and wound healing. It also supports iron absorption, contibutes to prostaglandin metabolism, and acts as an antioxidant that protects cells against oxidative damage. Consequently, insufficient vitamin C intake can affect multiple organ systems and lead to a wide range of clinical manifestations. Although scurvy is often considered a disease of the past, it continues to occur in modern clinical practice, including in developed countries where access to nutritious food is generally available [1,2,3].

The clinical manifestations of scurvy reflect impaired collagen formation and increased capillary fragility, often affecting the skin, gingiva, and musculoskeletal system. Common findings include gingival bleeding, perifollicular hemorrhages, corkscrew hairs, and delayed wound healing. Perifollicular hemorrhages typically appear as small petechiae sorrounding hair follicles, while corkscrew hairs are characterized by twisted, fragile hair shafts [1,4,5]. In pediatric populations demonstrating extreme dietary restriction, particularly those who avoid fruits, vegetable, or other vitamin C-rich foods, may be at increased risk of developing the disease [6]. Diagnosis scurvy can be challenging because its symptoms often resemble those of other systemic conditions, including hematologic, rheumatologic, neurologic, and malignant disorders. A detailed medical and dietary history, together with a comprehensive physical examination, is therefore essential for recognizing the disease. Measurement of serum vitamin C levels, when available, may provide additional diagnostic support, while a favourable clinical response to supplementation can further substantiate the diagnosis [1,4]. Without timely diagnosis and appropriate management, scurvy may progress and result in significant complications.

II. PURPOSE

This case report aims to describe the diagnostic challenges and management of scurvy in pediatric and adolescent patients, emphasizing the exclusion of hematological malignancies, and highlighting the role of multidisciplinary care team.

III. CASE REPORT

Case 1

A nine years old child was referred to Oral and Maxillofacial Surgery Clinic for oral examination with a history of spontaneous gingival bleeding, non-palpable cutaneous purpuric lesions and inability to walk. Physical examination revealed erythematous gingival tissues, perifollicular hemorrhages localized over the lower extremities, and soft tissue hematoma involving the right ankle (Figure 1 and 2). The patient was intially evaluated by an internist to rule out acute leukemia, lymphoma, or bone marrow failure syndromes. Comprehensive clinical and laboratory investigations confirmed the absence of hematologic malignancy. There are caries in his teeth and oral hygiene was poor. Diagnosis Scorbutic Gingivitis was made to this patient. Because the patient remained unable to walk, an orthopaedic surgeon was consulted. Continuous Passive Motion (CPM) therapy was recommended.

Management included antibiotic therapy and dietary modification. Vitamin C was administered at a reported dose of 100 mg every six hours for five days. Clinical examination showed changes in gingival manifestations following treatment (Figure 3). There are gradual improvement in his overall condition, which is reduced in gingival bleeding and general well being within five days following high-dose vitamin C treatment.





Figure 1. Intraoral appearance showed a swelling and erythematous in gingiva
Figure 2. Soft tissue hematoma affecting his medial part of right ankle



Figure 3. Clinical appearance 5 days after treatment showed gingival swelling was decreased

Case 2

A 17-year-old adolescent with autism was evaluated by a consultant in hemato-oncology. The presenting complaints included weakness, poor appetite, and gingival enlargement. Laboratory investigations revealed severe anemia, with an initial hemoglobin concentration 6.7 g/dL. Following transfusion of three units of packed red cells, the hemoglobin concentration increased to 11.2 g/dL. Hemostatic investigations were reported to be within normal limits. The patient was subsequently referred to an oral and maxillofacial surgeon, whose clinical assesment supported a hematological malignancy. A gingival biopsy was carried out under general anesthesia. On the sixth day following the biopsy, histopathological examination demonstrated specimens consist of tissue fragments lined by cutaneous epidermis. Beneath it, there is a dense proliferation of fibroblasts interspersed with histiocytes. Proliferation of blood vessels is observed between them. Infiltration of inflammatory cells (lymphocytes and plasma cells), as well as areas of hemorrhage are also visible. There is no evidence of atypia, mitosis, or necrosis. The interpretation of the specimen was granulomatous epulis. As the histopathological result showed gingival overgrowth with vascular proliferation, the progressive of oral manifestations and persistence of systemic symptoms, it can be suggested scurvy as the most likely diagnosis. Vitamin C was administered at a reported dose of 250 mg every six hours for three days. During therapy, the patient developed epistaxis. An otolaringologist treated the bleeding with tranexamic acid at 250 mg every eight hours and tropical nasal preparation. The epistaxis subsequently resolved, and vitamin C therapy was continued at a reduced dose of 250 mg every 12 hours. There are minimal improvement in gingival oedematous, possibly influenced by poor oral hygiene.





Figure 4. Intraoral clinical aspect of gingival enlargements in lower molar region
Figure 5. Perifollicular hemorrhages on upper limb





Figure 6. Clinical appearance 5 days after biopsy and treatment showed gingival swelling had minimal decreased because of poor oral health status

IV. CASE DISCUSSION

Within the pediatric population, susceptibility is heightened among children exhibiting dietary restrictions secondary to neuropsychiatric or developmental disorders. In particular, children with autism spectrum disorder often demonstrate highly restrictive eating behaviors, severely limiting their acceptance of foods with varied tastes, textures, or colors. The dietary patterns of these selective children characteristically exclude fresh products, such as fruits and vegetables, in favor of small portions dominated by dairy products and ultra-processed foods. This rigid, long-term adherence to a narrow dietary repertoire directly elevates the risk for profound nutritional deficiencies, including scurvy [7,8,9].

Vitamin C or ascorbic acid is a water soluble micronutrient characterized by a physiological half-life of 10 to 20 days [3,7]. This vitamin represents an essential dietary nutrient for humans due to an evolutionary accumulation of inactivating mutations within the gene encoding L-gulono-γ-lactone oxidase [10]. As an essential exogenous nutrient, vitamin C serves as a crucial cofactor for numerous metabolic pathways within the human body. The loss of this specific enzyme halts a critical oxidation step necessary for endogenous ascorbic acid synthesis. Although the physiological half-life of ascorbic acid ranges between 10 and 20 days, these early systemic manifestations only after 30 to 90 days of sustained dietary deficiency. The initial clinical presentation of scurvy typically involves non-specific symptoms, such as fatigue, anorexia, and weight loss [7].

The two cases demonstrate the importance of recognizing gingival abnormalities as potential manifestations of systemic disease. Gingival bleeding and impaired mobility in Case 1 and gingival enlargement in Case 2 occured alongside findings beyond the oral cavity, including perifollicular hemorrhage and anemia. Scurvy can mimic other systemic conditions because its clinical manifestations are not unique to vitamin C deficiency. Cutaneous bleeding and gingival abnormalities may raise concern for hematologic disease, while anemia and impaired mobility can prompt investigations for other systemic or musculoskeletal disorders. In Case 1, the initial assessment excluded hematologic malignancy before the patient was referred for oral and maxillofacial evaluation and inability to walk required broader multidisciplinary assessment. The normal hemostatic results in Case 2 provide useful clinical information but do not exclude all hematologic, vascular, or nutritional causes of bleeding. Similarly, improvement in hemoglobin after transfusion does not establish the etiology of anemia. The extensive gingival enlargement accompanied by diffuse erythema raised considerable concern for an underlying hematological malignancy. Consequently, in Case 2 an urgent biopsy

was performed to establish a definitive diagnosis. Give that the excessive gingival tissue extended into the occlusal plane and interfered with mastication, surgical debulking was undertaken, and the excised tissue was submitted for histopathological examination. Histopathological findings revealed inflammatory cellular changes without specific features of malignancy, suggesting a diagnosis of gingival enlargement rather than identifying the underlying sistemic etiology. Soft tissue hematoma involving the right ankle may represent a musculoskeletal of scurvy resulting from prolonged vitamin C deficiency. Ascorbic acid plays an essential role in collagen biosynthesis by supporting the hydroxylation of proline and lysine residues, which are necessary for collagen stability and connective tissue integrity. Vitamin C deficiency compromises the structural integrity of capillary walls and surrounding connective tissues, increasing vascular fragility and susceptibility to spontaneous bleeding. Histamine released by mast cells in the gingival connective tissue may influence local vascular response, contributing to increase erythema, bleeding tendency and gingival enlargement [9,10]. Hemorrhage may occur within the skin, muscles, and periarticular soft tissues, even in the absence of significant trauma [1,11,12]. This mechanism provides a plausible explanation for the combination of gingival changes and cutaneous hemorrhagic manifestation. However, the appearance of the gingiva alone can not establish the diagnosis. Gingival bleeding and enlargement may also be associated with local inflammation, hematologic disorders, medications, and other systemic conditions. The clinical significance of oral examination lies in its role in supporting a comprehensive assessment. In patients with unexplained gingival bleeding or enlargement, especially when accompanied by skin lesions, fatigue, anemia, or musculoskeletal complaints, clinicians should consider nutritional assessment alongside appropriate medical investigations [8].

A clinical diagnosis of scurvy was subsequently established through the integration of findings from the literature with the patient's clinical presentation. An accurate medical and dietary history, combined with a comprehensive physical examination, provided essential evidence supporting the diagnosis. Supplementary laboratory investigations are not mandatory to confirm the diagnosis. Laboratory test abnormalities in scurvy are insensitive. In line with this clinical paradigm, quantification of the serum vitamin C level was omitted in this patient due to the unavailability of this specific assay at our local healthcare facility. Futhermore, outsourcing the assay would incur significant financial costs and introduce an impractical turnaround time. Because ascorbic acid exceptionally safe and easily administered, treatment can be initiated based on strong clinical suspicion without waiting for laboratory confirmation [7].

The primary therapeutic objectives in managing scurvy are the rapid replenishment of ascorbic acid stores and prevention of disease relapse. The duration and dosage of treatment should be individualized. It is demonstrated that 200 mg per day results in marked improvement within several days. In this specific case, 100 mg of vitamin C administered three times daily for one week, followed by a maintenance dose of 100 mg once daily for six months [10,13]. Other recommendations are that 1 to 2 g of vitamin C daily for the first 2 to 3 days followed by 500 mg per day for the next week [7].

V. CONCLUSIONS

In conclusion, while scurvy is presently rare in modern clinical practice, it persists within specific vulnerable sub-populations. Maintaning a high index of clinical suspicion alongside meticulous history taking is critical for early detection, which subsequently facilitates the prompt initiation of therapy. The administration of ascorbic acid serves a dual purpose as both a diagnostic validation and therapeutic intervention. Ultimately, white the management of scurvy remains highly straightforward and cost-effective, the disease carries a significant risk of lethality if it remains unrecognized and untreated.

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