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Review Article

Management of Leukemic Gingival Enlargement in the Dental Office

Gayathri Priyadharshini Elangovan[1], Ramyaa R[1], Rithika K[1], Reshma B[1], Riswana Banu R[1]

[1]Department of Periodontology, Vivekanandha Dental College for Women, Tiruchengode, Tamil Nadu, India.



***Corresponding author:**
Gayathri Priyadharshini Elangovan,
Department of Periodontology,
Vivekanandha Dental College for Women,
Tiruchengode,
Tamilnadu, India.

gayathriaelangovan@gmail.com

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ABSTRACT

Oral signs are the first signs that appear in various systemic diseases affecting the body. Gingival enlargement can occur due to the accumulation of calculus, hormonal changes, certain medications, and certain malignancies. Leukemia is defined as an abnormal increase in the number of white blood cells inside the bone marrow, and sometimes oral signs will be the first clinical feature to appear in such conditions. Oral care for leukemic patients should be centred on meticulous oral hygiene and trauma prevention. Antibiotics are used to treat secondary infection that occurs due to bacterial, viral, and fungal manifestations. If need for any Periodontal surgeries, then they should be performed only after the patient completes their antineoplastic treatment. The current review article thus focused on collating the leukemic oral manifestations and demystifying the aetiology, mechanism, clinical features, and management of leukemic gingival enlargement.

Keywords: Gingival hyperplasia, Leukemia gingival enlargement, Oral manifestations of leukemia.

INTRODUCTION

Leukemia is a malignant oncological-hematological disease characterized by an abnormal increase in white blood cells.[1] The resulting deficiency of mature leukocytes, erythrocytes, and platelets consecutively leads to the development of anemia, immunodeficiency, and thrombocytopenia.[2] The etiology of leukemia includes constant exposure to chemicals, radiation, viral infections, and certain chromosomal abnormalities. The classification of Leukemias, based on their clinical course, is acute and chronic, and based on genetic origin, is lymphoid and myeloid types.[2] The worldwide incidence of leukemia according to 2021[1] is 61,090, with 23,660 deaths. Many systemic diseases will present with oral lesions as the initial or only manifestation, which act as a primary indicator for the definitive diagnosis of the underlying systemic disorders. Similarly, sometimes the oral signs are the first and only clinical feature in leukemic patients, so that the dental surgeons have an important role in early diagnosis and timely referral of patients as a part of an interdisciplinary approach to prevent a fatal outcome. Literature reveals 68% of leukemic patients present with oral mucosal lesions [2] affecting the gingiva, buccal mucosa, soft & hard palate. Gingival enlargement is an increase in the size of the gingiva. Systemic conditions that initiate gingival enlargement include leukemia, sarcoidosis, granulomatosis, Crohn's disease, hypothyroidism, and lysosomal storage disease.[3] The US National Cancer Institute guideline for the management of leukemia patients includes a multidisciplinary approach, which includes oncology, radiation, nutrition, dental, hematology, social, and other departments.[4] Accordingly, this review summarizes the oral manifestations of leukemia and sheds light on the importance of leukemic gingival enlargement, and also emphasizes the management of leukemic gingival enlargement.

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Table 1: Literature review on the management of gingival enlargement

Authors of reviewed articles	Oral manifestations	Patient's age (years)	Treatment
Gupta *et al.*[26]	Gingival enlargement with bleeding gums. Severe gingival enlargement and ecchymosis are present in the floor of the mouth.	68	The patient was advised to use a soft-bristle toothbrush and 0.2% chlorhexidine mouthrinse. Nonsurgical and surgical therapy were done. The patient was referred to the oncology department for chemotherapy.
Chang-Sung Kim[27]	Severe gingival enlargement	59	Patient advised for proper oral hygiene measures, and 0.2% chlorhexidine mouthwash was given. Gingival enlargement got resolved after the completion of the first phase of chemotherapy without any periodontal surgery.
Lex Leonhardt *et al.*[28]	Rapidly progressive gingival enlargement covering both the jaws with pain and necrotic lesions	55	The gingival enlargement resolved with the completion of chemotherapy treatment.
Stevenson and Patel[29]	Gingival enlargement, along with gingival bleeding, is present.	50	The patient received induction chemotherapy. There was a gradual improvement in gingival infiltration within 3 days after induction therapy.
Chowdhri K *et al.* (2018)[30]	Pale gingival and buccal mucosa, lobulated gingival enlargement with firm consistency, were present in both maxillary and mandibular arches. Pseudo pockets were present.	40	Blood and blood product transfusion followed by chemotherapy. Simultaneously, the patient was provided with antiemetics, analgesics, prophylactic antibiotics and antifungals, vitamins, and folic acid supplements. After two weeks, a bone marrow aspiration was taken.
Harshdeep Dhaliwal (2019)[31]	Diffused, generalized gingival enlargement which involves all interdental papillae, marginal and attached gingiva that covers up to the middle third of the tooth crowns	55	A bone marrow smear was advised as it is the gold standard test for leukemia. It showed depressed erythropoiesis and thrombopoiesis with 63% promyelocytes. A diagnosis of acute myeloid leukemia type M3 was confirmed. Then the patient was referred to the oncology department for treatment of leukemia. The gingival enlargement resolved with the completion of chemotherapy treatment.

Oral manifestations of leukemia

Oral Mucosa: Pale or erythematous mucosa, bleeding, and blue petechiae are seen in the mucosa, palate, tongue, and lips. Infections associated with *Candida albicans* and Herpes virus. Oral manifestations of lichen planus, erythema multiforme, pemphigus, and mucositis can also occur in leukemic patients.[5]

Gingiva: Spontaneous gingival bleeding, gingival hyperplasia, pale gingiva, bruising, and petechiae.[4]

Teeth: Tooth manifestations are due to side effects of leukemic treatment, which include Cervical tooth caries, odontalgia, destruction of alveolar bone and periodontal ligament, and teeth displacement.[6-9]

Bone: Occurrence of bony masses in the mandible, which clinically appear as hard swelling or multiple lobulated friable masses.[10-12]

Secondary and tertiary complications

Alteration in taste sensation, desquamation of skin, opportunistic infections, Dryness of mouth, dysphasia, permanent loss of taste sensation, osteoradionecrosis, chondronecrosis, and trismus are all due to radiation and chemotherapy.[13-17]

Leukemic gingival enlargement

Leukemic cells infiltrate into the gingiva, resulting in leukemic gingival enlargement that appears as enlargement of the gingival mucosa involving marginal, attached, and interdental papilla[18-20] or may appear as an oversized extension of marginal gingiva[21,22] or as a discrete tumour-

like enlargement involving interdental papilla.[23,24]

Pathogenesis

Leukemic gingival enlargement does not occur in edentulous areas, and in chronic leukemic patients, there will be accumulation of immature leukemic blast cells in the gingiva area adjacent to tooth surfaces with bacterial plaque accumulation.[25] Thisincreases the gingival thickness, leading to gingival enlargement. It may be localized to the interdental papilla or may extend to marginal gingiva and attached gingiva, covering the entire crown of the teeth.[25]

Histopathology

Epithelium with profuse leukocytic infiltration and edema is found. Engorged capillaries, edematous and regressed connective tissue. Leukemic cells are characterized by abundant mitotic figures and are densely packed within the lamina propria that extends from the epithelial basal layer into the underlying connective tissue, which alters the normal anatomy. The infiltration compresses the regional blood vessels. Acute necrotizing inflammation with pseudo membranous meshwork of fibrin, polymorphonuclear leukocytes, bacteria, and necrotic epithelial cells is seen.[25]

Management of leukemic gingival enlargement

Periodontal procedures at different stages of leukemia

It is important to take note of hematological parameters, such as neutrophil and platelet counts, before any periodontal surgical procedures. Clinical examination, oral hygiene maintenance, and radiographic imaging are non-invasive procedures that don't require special precautions and can be performed. Periodontal procedures should be performed 3 days before the start of the chemotherapy procedure and before the granulocyte level reaches less than 500 cells/mm^3.

Leukemic patients who have undergone bone marrow transplantation and chemotherapy usually require 6 to 12 months to rehabilitate their immune systems. Therefore, dental procedures and periodontal surgeries should not be performed during this period. In case of spontaneous bleeding, the dentists must impede the hemorrhage using various vasoconstrictor agents, tissue guards, collagen, and various hemostatic agents. Topical thrombin application will be effective in stabilizing the blood clots. If bleeding endures, a platelet transfusion is needed. Table 1 summarizes the literature review on the management of leukemic gingival enlargement.[26-31]

DISCUSSION

Most commonly, gingival enlargement is a plaque-induced inflammatory process or due to any systemic diseases or medications. Leukemic gingival enlargement is due to leukemic cell infiltration within the gingival tissue, which is clinically observed as diffuse enlargement affecting the marginal, attached gingiva, and interdental papillae. In the most pronounced form, the involvement covers the entire crowns of the teeth. Gingiva seems swollen, with color varying from pale red to purple, and the gingiva appears devoid of stippling. Histologic features are characterized by abundant mitotic figures and densely packed leukemic cells in the lamina propria. Leukemic gingival enlargement may be underdiagnosed in everyday dental practice, as it is rarely seen. It is inevitable for dental surgeons to have sound knowledge of the various causes of gingival enlargement and to elicit proper history, examination, and investigations to arrive at an accurate diagnosis. The timely referral is important to prevent life-threatening complications. Proper oral hygiene measures are anessential part of general treatment in leukemic patients. Maintenance of good oral hygiene improves patient comfort and prevents complications associated with therapy. Consultation with an oncologist and proper laboratory investigations, like platelet count, neutrophil count, and International Normalized Ratio (INR), should be verified before any dental procedures.[32-34]

CONCLUSION

Leukemia usually presents its first manifestations in the oral cavity as gingival enlargement along with gingival bleeding and ulcers. Thus, dentists play a crucial role in the early diagnosis. The dentist recognizes the signs and symptoms of leukemia and confirms the suspicion through tests, which allows patients life expectancy. In the multidisciplinary approach, the dentist playsa major role in all stages withthe medical team.

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