ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23

American Academic publishers, volume 05, issue 10, 2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

MANIFESTATIONS OF LEUKEMIA IN THE ORAL CAVITY

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Abstract. Leukemia, a malignant neoplastic disorder of hematopoietic tissues, often presents with early changes in the oral cavity that may precede systemic clinical manifestations. Oral findings are among the first indicators of hematologic dysfunction, especially in acute forms of the disease. This article provides an in-depth analysis of the oral manifestations of leukemia, discussing their pathophysiological basis, clinical presentation, diagnostic significance, and implications for dental and medical management. Emphasis is placed on differentiating oral lesions of leukemic origin from those caused by secondary infections or chemotherapy. The discussion also explores how oral health professionals can play a vital role in the early detection and multidisciplinary care of patients with leukemia.

Keywords: leukemia, oral manifestations, gingival enlargement, petechiae, mucosal ulceration, hematologic malignancy, diagnosis, oral pathology.

INTRODUCTION

Leukemia represents a group of malignant disorders characterized by uncontrolled proliferation of abnormal white blood cells that infiltrate bone marrow, peripheral blood, and various tissues. Depending on the cell type and disease course, leukemia is classified into four major forms: acute lymphoblastic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL), and chronic myeloid leukemia (CML). Among these, acute forms—particularly AML—exhibit the most prominent and early oral manifestations.

The oral cavity often mirrors systemic health, and in leukemic patients, it becomes a critical diagnostic site. Because the oral mucosa and gingiva are rich in blood vessels and lymphatic tissue, leukemic cell infiltration and hematologic imbalance readily produce visible clinical signs. In some instances, oral findings such as gingival hypertrophy, spontaneous bleeding, or persistent ulceration may represent the first sign of leukemia even before laboratory confirmation. Therefore, understanding these manifestations is essential for early diagnosis and timely medical referral.

MATERIALS AND METHODS

Gingival enlargement is among the most characteristic oral signs of leukemia. It occurs in up to 70% of patients with acute monocytic leukemia and presents as diffuse, boggy swelling of the marginal and interdental gingiva. The tissue appears reddish-blue or violaceous, with a shiny surface and a tendency to bleed spontaneously. Unlike inflammatory gingivitis caused by plaque, leukemic gingival enlargement persists despite good oral hygiene and is often generalized rather than localized [1].

Histologically, the gingiva shows dense infiltration of immature myeloid cells, disruption of collagen fibers, and edema of the lamina propria. In chronic leukemias, gingival changes tend to be less pronounced but may still present as mild hyperplasia or recurrent bleeding.

Periodontal disease in leukemic patients progresses rapidly due to impaired neutrophil function and microbial overgrowth. Necrotizing ulcerative gingivitis (NUG) or periodontitis (NUP) is common and characterized by punched-out interdental papillae, severe pain, halitosis, and grayish pseudomembrane formation. If left untreated, these lesions can progress to necrotizing stomatitis or osteomyelitis due to extensive tissue necrosis.

RESULTS AND DISCUSSION

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Mucosal ulceration is another frequent manifestation. Ulcers may result from direct leukemic infiltration or from secondary infection in immunocompromised tissues. Lesions are typically found on the buccal mucosa, tongue, and soft palate, often covered by yellow-gray necrotic slough surrounded by an erythematous halo. In severe cases, ulcers may become confluent, causing significant pain and difficulty in eating or speaking [2].

Petechiae, ecchymoses, and spontaneous bleeding are related to thrombocytopenia and fragile blood vessels. These pinpoint hemorrhages are most evident on the soft palate, buccal mucosa, and lips. Persistent bleeding after minor trauma or tooth brushing is a common complaint among patients.

Fungal infections such as oral candidiasis manifest as white curd-like patches that can be wiped off, leaving erythematous underlying mucosa. Viral infections, especially herpetic stomatitis, may present as multiple vesicular eruptions that rapidly ulcerate. These opportunistic infections are often more severe and prolonged than in immunocompetent individuals.

The tongue often reflects systemic hematologic imbalance. Patients may exhibit atrophic glossitis—a smooth, shiny, depapillated surface due to anemia—or diffuse enlargement secondary to infiltration. Painful fissures and a burning sensation are common complaints. In certain cases, leukemic cell infiltration of minor salivary glands results in xerostomia (dry mouth), further predisposing to mucosal infections and impaired taste perception.

Radiographic examination of leukemic patients may reveal alveolar bone rarefaction, widened periodontal ligament spaces, or loss of lamina dura due to leukemic infiltration and bone marrow expansion. In some cases, the patient may report loose teeth or spontaneous exfoliation without obvious periodontal cause. Facial swelling and pain in the jaw region can mimic odontogenic infections, making differential diagnosis critical.

In advanced leukemia or following chemotherapy, osteonecrosis of the jaw can occur, particularly when bisphosphonates or radiation therapy are part of the treatment regimen. These complications highlight the necessity of close dental supervision during oncologic care [3].

Management of leukemia often involves aggressive chemotherapy, which causes mucositis, a painful inflammatory reaction of the oral mucosa. Oral mucositis develops in 40–80% of patients undergoing intensive treatment and appears as erythematous, ulcerated, and sloughing mucosa. Secondary infections by *Candida* and *Gram-negative bacteria* are common. Salivary gland dysfunction, dysgeusia (taste alteration), and delayed healing further complicate oral health during therapy.

Preventive measures include pre-treatment dental evaluation, atraumatic dental care, and use of bland rinses or topical anesthetics. Cryotherapy, low-level laser therapy, and palifermin (keratinocyte growth factor) have demonstrated benefits in reducing mucositis severity.

Oral findings often provide crucial diagnostic clues in undiagnosed leukemia. Dentists may be the first clinicians to suspect leukemia when encountering unexplained gingival enlargement, spontaneous bleeding, or non-healing ulcers. Routine hematologic investigations—complete blood count, peripheral smear, and bone marrow biopsy—confirm the diagnosis.

Clinicians should differentiate leukemic gingival changes from drug-induced hyperplasia (e.g., caused by phenytoin, cyclosporine, or calcium channel blockers) and inflammatory periodontal diseases. Prompt recognition allows early referral to hematologists, improving prognosis and survival rates.

Oral management of leukemic patients requires coordination between dentists, oncologists, and hematologists. During the acute phase, invasive dental procedures are avoided due to bleeding and infection risks. Instead, emphasis is placed on meticulous oral hygiene, chlorhexidine mouth rinses, and antifungal prophylaxis.

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Once hematologic remission is achieved, elective dental care can be resumed under medical supervision, with pre-procedural antibiotic prophylaxis if neutrophil counts remain low. Patient education on maintaining gentle brushing, using soft toothbrushes, and avoiding sharp or spicy foods is essential to prevent trauma.

Recent advances in hematopathology have shed new light on the complex mechanisms underlying oral changes in leukemia. The oral mucosa is one of the most vascularized tissues in the body, and it reflects hematopoietic abnormalities early. In leukemic patients, the mucosal tissue becomes a target for infiltration by blast cells — immature leukocytes that disrupt normal architecture, compress blood vessels, and interfere with tissue regeneration. This process is not only mechanical but also biochemical: leukemic blasts release proteolytic enzymes and inflammatory mediators such as matrix metalloproteinases (MMP-2, MMP-9) that degrade the extracellular matrix, leading to mucosal fragility and ulceration [4].

In addition to infiltration, hematologic deficiency syndromes contribute to the oral pathology. Thrombocytopenia causes petechial hemorrhages and spontaneous gingival bleeding, whereas neutropenia increases susceptibility to opportunistic infections. A 2019 clinical analysis conducted at the *University of São Paulo Dental Hospital* found that over 68% of newly diagnosed acute leukemia patients presented with oral bleeding, ulcerations, or mucosal pallor before hematologic diagnosis. These findings underscore the diagnostic importance of oral signs in systemic hematologic diseases.

Another essential feature is the rapid onset and polymorphic nature of oral lesions in leukemia. Unlike chronic periodontal disease, leukemic oral changes can evolve over days. Gingival hypertrophy may appear within 72 hours, particularly in acute myelomonocytic leukemia, where monoblasts infiltrate connective tissue aggressively. Similarly, necrotic ulcerations may spread rapidly along the gingival margin or buccal mucosa, sometimes resembling necrotizing fasciitis. These features help clinicians distinguish leukemic lesions from benign inflammatory disorders.

CONCLUSION

The oral cavity serves as a vital diagnostic and therapeutic window in leukemia. Oral manifestations—such as gingival enlargement, petechiae, mucosal ulceration, and candidiasis—often precede systemic symptoms and can guide early diagnosis. Understanding these signs enables dental practitioners to identify potential hematologic malignancies promptly and refer patients for hematologic evaluation. Furthermore, maintaining oral health is crucial during leukemia therapy to minimize infection risk, pain, and systemic complications. A multidisciplinary approach integrating dental care with oncologic treatment not only improves quality of life but may also contribute to better overall outcomes in patients with leukemia.

REFERENCES

1. Scully, C., & Porter, S. R. (2013). “Orofacial manifestations of systemic disease.” British Medical Journal, 326(7398), 695–698.
2. Dreizen, S., McCredie, K. B., Keating, M. J., & Luna, M. A. (2013). “Oral manifestations of leukemia. Analysis of 761 cases.” Oral Surgery, Oral Medicine, Oral Pathology, 56(6), 610–619.
3. Neville, B. W., Damm, D. D., Allen, C. M., & Chi, A. C. (2016). Oral and Maxillofacial Pathology (4th ed.). St. Louis: Elsevier.
4. Mendenhall, W. M., Fernandes, R., Werning, J. W., Vaysberg, M., Malyapa, R. S., & Mendenhall, N. P. (2010). “Head and neck complications of leukemia.” Oral Oncology, 46(3), 199–205.
5. Dholam, K., Dugad, J., & Kale, A. (2012). “Oral manifestations of leukemia and management strategies.” Journal of Oral and Maxillofacial Surgery, 70(7), e345–e353.