

Original Contributions

Prevalence of oral lesions in and dental needs of patients with newly diagnosed acute leukemia

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ABSTRACT

Background. Dentists are generally taught that in a significant number of patients with newly diagnosed acute leukemia (NDAL), the diagnosis may be suspected based on oral signs. In this study, the authors determined the frequency of oral signs of leukemia and tabulated the clinical dental needs and hematologic aspects of these patients.

Methods. Four calibrated dentists performed clinical examinations in 263 consecutive patients with NDAL. A standardized data form was used to direct and record presence or absence of oral signs of leukemia, clinically apparent dental disease, and circulating blood counts.

Results. Oral signs of leukemia were detected on oral examination in 30.8% (95% confidence interval [CI], 25.2% to 36.4%) of patients with NDAL on examination. Only 5.7% (95% CI, 2.9% to 8.5%) of patients had gingival enlargement (GE). Although 33.7% (95% CI, 26.6% to 40.9%) of regular dental treatment seekers and 55.3% (95% CI, 45.3% to 65.4%) of nonregular dental treatment seekers had clinically detectable dental disease, only 18.6% (95% CI, 13.9% to 23.3%) had circulating blood counts that precluded all but urgent oral health care.

Conclusion. Although 30.8% of patients examined had some oral sign of leukemia, most adults with NDAL do not have GE at the initial examination. Even patients receiving regular oral health care may have unmet dental needs at the initial assessment that could safely be addressed before treatment.

Practical Implications. Dentists should not necessarily expect to be able to detect overt oral signs of leukemia, such as GE, in patients with NDAL on oral examination. Once patients receive the diagnosis, dentists may be able to safely eliminate dental disease in most patients in an appropriate setting. Dentists are encouraged to undertake a thorough review of systems.

Key Words. Hospital dentistry; cancer; gingiva.

JADA 2018; ■(■):■-■

<https://doi.org/10.1016/j.adaj.2018.01.019>

Leukemia is the ninth most prevalent cancer in the United States, accounting for 3.7% of all cancer diagnoses; there were 62,130 new cases in 2017.¹ Leukemia is a general term for a group of malignant hematologic disorders arising from hematopoietic stem cells and characterized by disorganized proliferation of neoplastic cells.² Historically, leukemias were broadly classified into 4 main categories based on the origin of the blood cell (myeloid versus lymphoid) and disease characteristics (acute versus chronic).³ Advances in understanding of molecular, histomorphologic, and genetic changes have resulted in a new classification for acute leukemia (AL).⁴ The World Health Organization (WHO) classification of myeloid neoplasms and AL includes, but is not limited to, myeloproliferative neoplasms, such as myelofibrosis; myelodysplastic syndromes; acute myeloid leukemia (AML) and related neoplasms; acute leukemia (not otherwise specified); and B- and T-lymphoblastic leukemia or lymphoma (ALL).^{5,6} AML and related neoplasms can be further subdivided into more than 20 subtypes, each with specific diagnostic criteria, differing treatment, and prognosis.⁶

AL leads to anemia, thrombocytopenia, and neutropenia.⁷⁻⁹ Systemic signs of anemia include shortness of breath, fatigue, and pallor.^{7,8} Neutropenia can result in fever and

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infection, although thrombocytopenia may result in spontaneous bleeding, ecchymosis, and petechiae.⁷⁻¹⁰

Profound neutropenia and thrombocytopenia due to leukemia can prevent or complicate elective and even urgent oral health care.^{11,12} Immunosuppressive chemotherapy prolongs these periods, and untreated dental disease can infrequently become life threatening.^{12,13} Limited up-to-date information on infectious complications of dental disease during leukemia and scant evidence of the dental conditions of leukemia patients at the time of diagnosis exist; most studies focus on patients seen before a hematopoietic stem cell transplant.¹⁴⁻¹⁷

In all phases of oral health care, there are no absolute minimum platelet or neutrophil counts required before initiating invasive dental procedures.¹⁸ It is suggested that when the platelet count is less than 50,000 to 60,000 per cubic millimeter (mm^3), a platelet transfusion may be performed before surgical procedures,^{8,14,19} and a neutrophil count less than 500 to 2,000 cells per mm^3 may require antibiotic prophylaxis.^{9,14} Similarly, if the neutrophil count is less than 1,000 cells per mm^3 , elective treatment should be postponed, and emergency treatment along with antibiotic coverage should be discussed with the medical team.¹⁴

Dental educators are generally taught that the oral cavity is a common location for signs and symptoms of leukemia and that these may be sentinels of the disease.^{8,10} A literature review reveals numerous case studies suggesting that AL commonly involves oral manifestations, such as gingival bleeding, gingival enlargement (GE), gingival ulcerations, petechia, and candidiasis when it is initially diagnosed.²⁰⁻²⁴ These so-called common clinical signs of leukemia listed above are noted in authoritative oral pathology texts.^{8,9,25-27} Little and colleagues⁹ state that GE occurs in up to 36% of patients with AL, although *Burket's Oral Medicine* suggests gingival bleeding is one of the most common signs of AL.²⁷

In 1964, the first study recording oral signs specific to AL by Roath and colleagues²⁸ suggested that 20% of patients who received a diagnosis of AL also had “mouth lesions.” In 1967, Lynch and Ship²⁹ found that 58% of patients with AL had oral signs of the disease. A later postdiagnostic study implied that the oral manifestations of leukemia were more common during the postdiagnostic phase than when patients were initially examined.³⁰ In 1978, Tagaki and colleagues³¹ studied 16 patients with acute promyelocytic leukemia, in which 50% of patients were first seen by a dentist. In 1980, Stafford and colleagues³² found that dentists were responsible for ordering hematologic tests that led to a diagnosis of leukemia in a quarter of patients with AML and one-third of patients with acute myelomonocytic leukemia. In 1983, Dreizen and colleagues³³ evaluated medical charts of 1,076 acute and chronic leukemic patients hospitalized for chemotherapy over a 16-year period and found evidence of gingival infiltrates in 3.6% of all leukemic patients, with the highest incidence in acute monocytic leukemia, followed by acute myelomonocytic leukemia and acute myelocytic leukemia. In 1997, Hou and colleagues³⁴ performed a retrospective study of 230 cases and found 43.2% of patients with AML, and 28.6% of patients with ALL had gingival bleeding when initially examined. A summary of these studies can be found in [Table 1](#).

In the United States, 62% of people 18 years or older visited a dentist in the past year.³⁵ One could cautiously assume that 40% of adults with newly diagnosed acute leukemia (NDAL) may not have seen a dental professional in over a year. These patients may have untended oral disease at the time of diagnosis, which could predispose them to serious sequelae during myelosuppressive chemotherapy.¹¹ The aim of this study is multifold:

- assessing the frequency of oral signs of AL in patients with NDAL including GE, oral petechia, oral bleeding, or acute oral infections;
- quantifying the clinically visible dental treatment needs of patients with NDAL before undergoing chemotherapy;
- assessing the prevalence of patients with NDAL who have hematologic counts that permit care to be delivered before commencement of their chemotherapy.

METHODS

The Rapid Assessment Clinic (RAC) at the Princess Margaret Cancer Centre, Toronto, Ontario, Canada, assesses patients on the day of their leukemia workup. It is the task of RAC to triage, diagnose, and assess patients suspected as having AL who are referred from other medical practitioners and institutions. The assessment is comprehensive, including, but not limited to, tissue banking, bone marrow aspirate and biopsy, 12-lead electrocardiogram, and diagnosis disclosure, and, since November 1, 2014, all patients from RAC are routinely screened in the dental department.

ABBREVIATION KEY

Abx:	Antibiotics.
AL:	Acute leukemia.
ALL:	B- and T-lymphoblastic leukemia or lymphoma.
AL NOS:	Acute leukemia (not otherwise specified).
AML:	Acute myeloid leukemia.
GE:	Gingival enlargement.
GH:	Gingival and periodontal health.
HgB:	Hemoglobin.
MDS:	Myelodysplastic syndromes.
MF:	Myelofibrosis.
MR:	Missing restoration.
NDAL:	Newly diagnosed acute leukemia.
OH:	Oral hygiene.
Plts:	Platelets.
RAC:	Rapid Assessment Clinic.
WBC:	White blood cells.
WHO:	World Health Organization.

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