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# *Dental intervention prior to and subsequent to the diagnosis of acute myeloid leukemia: case report*

# *Intervenção odontológica prévia e subsequente ao diagnóstico de leucemia mielóide aguda: relato de caso*

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## ABSTRACT

Leukemia's are characterized by the proliferation of immature white blood cells, called blasts, in the bone marrow and / or blood. Among them, we highlight the Monocytic Acute Myeloid Leukemia, which represents a malignant neoplasm whose unnatural monoblast proliferation results in suppression of myeloid series cells. Oral manifestations are common, arising at the onset of the disease and are also associated with chemotherapy during treatment leading to complications that compromise oncotherapy. The present study deals with a patient with this type of aggressive leukemia, with oral complications of the disease and later, oncological treatment. It also give prominence the performance of the dental surgeon in distinct phases of the treatment emphasizing the importance of maintaining oral health in cancer patients. The presence of the Dentist in the multi-professional team contributes to the reduction of manifestations that occur both due to the disease and the treatment, ensuring a better quality of life for cancer patients and avoiding higher expenses to the health system.

**Indexing terms**: Dental care. Leukemia. Oral health. Oral manifestation.

## RESUMO

*As leucemias são caracterizadas pela proliferação de células imaturas da linhagem branca, denominadas blastos, na medula óssea e/ou sangue. Dentre elas destacamos a Leucemia Mielóide Aguda Monocítica, que representa uma neoplasia maligna, cuja*

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*proliferação anormal de monoblastos resulta na supressão das células da série mielóide. Manifestações orais são comuns, surgindo no início da doença e também associadas à quimioterapia durante o tratamento gerando complicações que comprometem a oncoterapia. O presente trabalho trata-se de um paciente portador deste tipo agressivo de leucemia, com complicações bucais da doença e posteriormente, do tratamento oncológico. Destaca ainda a atuação do cirurgião-dentista em fases distintas do tratamento realçando a importância da manutenção da saúde bucal em pacientes oncológicos. A presença do Cirurgião-Dentista na equipe multiprofissional contribui para diminuição das manifestações que ocorrem tanto devido à doença quanto ao tratamento, garantindo melhor qualidade de vida do paciente oncológico e evitando maiores gastos ao sistema de saúde.*

***Termos de indexação***: *Assistência odontológica. Leucemia. Saúde bucal. Manifestações bucais.*

## INTRODUCTION

The Acute Myelomonocytic Leukemia (AMML) incorporates a subtype of leukemia in which there is a clonal proliferation, with a rapid progression of the immature cells from the myeloid line (blasts). There is loss of the spinal differentiation capacity and, therefore, the count of the elements that compose the peripheral blood decreases [1-3]. The AMML represents from 15% to 20% of the acute leukemia cases in children, while it is present in 80% of the cases in adults, with an increased frequency in elders [4,5]. The survival time depends on the age and the treatment, and can reach up to 5 years in approximately 30% of the patients under 60 years in controlled oncological treatment [6-7].

Thus, the choice of treatment is based on a precise prognosis evaluation, which considers the waiver and death risks related to the treatment, being the chemotherapy the most used antineoplastic therapy [8]. However, the oncologic treatment can trigger complications associated with buccal manifestations, as xerostomia, mucositis, viral or fungal infections, aggravation of odontogenic infection, enamel hypoplasia [9]. Furthermore, the clinical manifestations of the disease can induce to buccal complications as: xerostomia, mucous membrane paleness, hemorrhagic and ecchymosis disorders, due to pancytopenia. Still, the gingival hyperplasia is present, caused by the leukemic infiltration [10,11].

Thus, it is clear that the modifications in the buccal cavity resulting from the AMML decrease considerably the patient's quality of life, and can culminate in the treatment interruption [12]. In addition to generating more costs to the health services, and extending the hospitalization period [12]. Therefore, this work emphasizes the impact of dental intervention in a patient with AMML during the diagnosis investigation period and after the definitive diagnosis. With this report we demonstrated the effectiveness of dental conduct in a patient with severe, systemic and acute degree of disease.

## CASE REPORT

15-year-old patient, male, admitted for hospitalization in a regional reference hospital for the neoplasms treatment in Juiz de Fora - Brazil, for the diagnostic investigation. Due to gingival pain and tooth displacement, a dental evaluation was requested. This research was approved by the Comitê de Ética em Pesquisa da Universidade Federal de Juiz de Fora (Ethics in Research Committee of Universidade Federal de Juiz de Fora).

The dental evaluation included the medical history obtainment through the medical records, for the collection of data related to the systemic condition and diagnosis hypothesis, besides a systemic evaluation of the buccal cavity through: orofacial systematic evaluation record, which assesses the stomatognathic system, based the dental history and orofacial physical exam; the decayed, missing, and filled teeth index (DMFT) which indicates the average numbers of permanent teeth decayed, missing and filled [13], and periodontal evaluation: gingival index (GI) [14] and the plaque index (PI) [15]. The periodontal evaluation verifies the periodontal disease degree and its activity. The GI registers alterations in the shape and contour of the periodontal tissues, where GI 0 corresponds to a normal gum; GI 1 is a gum with moderate inflammation, slight change of color, mild edema, with no bleeding on probe; GI 2 corresponds to a gum with moderate

inflammation, redness, edema and with bleeding in probe and GI 3 is equivalent to gum with acute inflammation, redness, edema, ulcerations and bleeding [14]. The PI is used to evaluate the buccal hygiene condition, calculated by the spontaneous number of dental surfaces colored by plaque disclosing tablets, multiplied by 100 and divided by the overall number of surfaces [15].

During the dental clinical examination, we detected the presence of submandibular lymph nodes with hyperplasia, identified during the palpation. In the intraoral clinical examination, we noted the presence of an intense gingival edema. According to the patient, the condition started about 20 days before the exam. It caused pain during the mastication and tooth displacement (figure 1). We also observed dry lips.

**Figure 1**. Clinical aspect found in the first appointment, demonstrating the presence of an acute leukemic infiltration in the lower posterior teeth region.

The patient presented decayed, missing, and filled teeth index = 0 (DMFT) [13]; periodontal evaluation: gingival index = 3 (GI) [15] and plaque index = 46.5% (PI) [14]. The dental exam did not show any degree of tooth displacement, although this was one of the patient's complaints.

A slight supragingival scaling was performed and we prescribed the use of the 0.12% chlorhexidine gluconate without alcohol (aqueous solution) twice a day; hydration with all-rac-alpha-tocopheryl acetate (Vitamin E 400mg); and 20% benzocaine topical anesthetic 20% (one "berry pea-sized" portion was provided to the patient) in the gingival surface before the meals for a better analgesia and more comfort during the alimentation. After the confirmation of the AMML diagnosis, and three days after the adherence of the oral care, the patient initiated the chemotherapy with daunorubicin and cytarabine.

In the dental reevaluation, after fifteen days, the GI decreased to = 1, PI = 25.5%, and the DMFT index remained the same (figure 2). The dental care and the action of the drugs used reduced the clinical indications of inflammation, and, due to the pain relief while chewing, made it possible for the patient to eat normally again.

In a second moment, with the patient still under chemotherapy treatment, oral mucositis lesions emerged in the palate and in the free gingival margin (figures 3 and 4). The patient complained about intense pain, which made him stop eating and caused a ponderal deficit.

Again, the removal of the supragingival plaque was performed with the use of gauze and/or cotton impregnated with chlorhexidine, and low-powered laser application (Photon Lase III - PL7336, DMC), on a 90° angle with the gingival

**Figure 2**. Clinical aspect in the revaluation, after the dental care was started.

**Figure 3**. Frontal view of the patient showing petechial hemorrhage throughout the upper anterior gum, and bleeding areas in incisively papillae.

surface and not touching the tissue (660 nm, 50 mW, 4J/cm$^2$, 90 seconds) and hydration with the all-rac-alpha-tocopherol acetate (Vitamin E 400mg). After fifteen days of dental care, the lesions fully regressed, and the patient's health and masticatory function were restored.

Since the hospitalization, the patient had a fever, despite the antibiotic therapy, evidencing the severity of the case and the bad prognosis of this neoplasia. During the antineoplastic treatment, the patient developed toxicity to the chemotherapy, manifested as tumor lysis syndrome, hepatotoxicity and pancytopenia. After ten months of dental treatment, successive side effects and, consequently, irregularity in the chemotherapy cycles, the patient died due to the pulmonary sepsis associated to the general conditions developed by leukocytosis and hepatosplenomegaly.

**Figure 4**. Oral mucositis in the hard palate area, presented as an ulceration in the anterior region of the palate.

## DISCUSSION

This report about a patient with AMML illustrates and highlights the importance of the dental accompaniment, evaluation and treatment in a case of acute neoplastic disease. Whilst the systemic disease severity sometimes implies in the negligence with the buccal health by the patient, and even by the healthcare team, the buccal manifestations presents intense symptomatology and can be debilitating, leading to risks during the treatment [12,16-18].

We observed, through the buccal clinical exam, in the diagnosis investigation phase, the presence of an edema, gingival hyperplasia, petheciae and bleeding in the papilla area, which are common clinical indications of AMML in the buccal cavity [6,10,11]. A relevant aspect observed was the regression of the patient's leukemic infiltration and symptomatology resulting from the synergistic action of the local dental and chemotherapy care in two weeks. Usually, it takes three weeks for the gingival leukemic infiltration to decrease after the antineoplastic therapy is started [19].

Initially, we observed gingival index = 3 (GI) [15] and plaque index = 46.5% (PI) [14]; decreasing to GI = 1, PI = 25.5% fifteen days after the introduction of the dental care. We noted that the patient's buccal health had a significative improvement during the chemotherapy. In this specific case, the dental accompaniment may have contributed for this evolution. Nevertheless, a previous study found that the oncotherapy causes a worsening in the condition of the buccal health; however, that happens when there is no the prophylactic dental care [20].

The treatment was based on the dental complaint (gingival edema causing pain) made by the patient, and aimed at reducing the quantity and quality of dental biofilm through the mechanic removal of the plaque and the use of 0.12% chlorhexidine gluconate. The mechanic action in the biofilm is essential and provides the buccal dysbiosis control [21,22], and the chlorhexidine is an efficient bactericide for the dental supragingival and subgingival biofilm [23]. It was indicated the topical use of all-rac-alpha-tocopherol acetate. This substance has an emollient action in the oral cavity, decreasing the inflammation [24]. Since the patient was in the acute phase and presented high levels of pain while eating, we indicated the use of small doses of 20% benzocaine topical anesthetic. The benzocaine hydrochloride is effective at controlling the pain, as it inhibits the sodium channels and prevents the cell depolarization, slowing the conduction of the signal, thus decreasing the capacity of the action potential to arise [25].

It is important to highlight that the patient presented decayed, missing, and filled teeth index = 0 (DMFT) [14], presenting a good dental health condition previously to the AMML diagnosis. The maintenance of this health through

the dental accompaniment reduces the risk of buccal complications [26]. Thus, with the established care, a significant reduction of the gingival inflammation has occurred, which resulted in the improvement of the dental complaint, and the alimentation quality. The treatments in periodontal health maintenance, buccal hygiene instructions, fluorine and chlorhexidine use are important therapeutic strategies that reduce morbidities during the oncotherapy [26].

After the AMML diagnosis confirmation, we started a treatment with daunorubicin, which is a chemotherapy medication, an antineoplastic antibiotic and cytarabine, which acts in the induction of leukemia remission. When they are associated, the treatments have better results [1, 10]. However, a frequent side effect in the buccal mucosa is the mucositis [27]. In this report, the patient had oral mucositis in the palate and marginal gum, in the previous region that was treated with laser therapy and local care for the reduction of the dental biofilm [9,27,28]. The laser's effectiveness is verified and, therefore, it is frequently used in treatment of this kind of lesion [29]. The low-powered laser action mechanism promotes tissue regeneration, inflammation reduction and pain control through the biomodulatory therapy with the use of light [29]. The reduction of the dental biofilm is also a contributory factor for the treatment of mucositis, since high plaque levels are associated with high oral mucositis incidence [30].

Besides these treatments, the topical all-rac-alpha-tocopherol acetate application (Vitamin E 400mg) was indicated as an adjuvant to the oral mucositis therapy. The vitamin E has antioxidant characteristics, acting in the elimination of free radicals released during the inflammation, acting to heal the mucositis. After fifteen days of dental treatment, the lesions regressed and the patient's normal functions were restored [24].

Although the severe systemic complications that caused the patient's death, the dental accompaniment and treatment contributed for the patient's better nutrition and comfort. The promotion and maintenance of buccal health enabled the well-being and convenience, resulting in positive impacts for the patient, staff and the health service.

## CONCLUSION

The dental care was essential in all the phases of the AMML progression, either for the prevention or the treatment of buccal manifestations. The accompaniment and implementation of specific treatments for each buccal complication had a positive impact, preventing the interruption of treatment and improving the patient's well-being of the patient, bearer of this severe disease, which caused his death.

### Collaborators

IS Oliveira, conceptualization, data curation, writing - first essay and methodology. NM Nascimento, writing – first essay, methodology. MGAM Chaves, writing – proofreading and editing, methodology and supervision. TC Esteves, conceptualization, methodology, validation and supervision. LC Lenz e Silva, methodology, validation and supervision. GMC Fabri, conceptualization, writing – proofreading and editing, methodology, supervision and validation.

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