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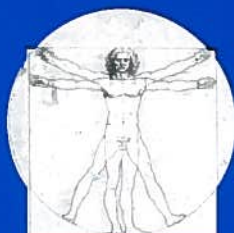
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PERIODONTAL LESIONS AND GINGIVAL PROBLEMS IN CHILDREN WITH ACUTE LYMPHOBLASTIC LEUKEMIA

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Dentists both as clinical practice and research increased progressively their interest in leukemia, because the oral complications are common during the outcome of the disease, dental management is complex, and the mouth is a potential source of morbidity. The aim of this review is analyzing the most important periodontal problems due to childhood Leukaemia. Infact only with an appropriate periodontal treatment oral health could be maintained and restored before development of irreversible periodontal damage. Our experience suggests that even if detrimental impact of antineoplastic therapy on oral cavity is unavoidable, it could be diminished with an adequate and correct preventive or curative therapy contributing to a better quality of life of children treated for cancer.

Periodontal lesions and gingival problems

Oral signs may be the first presentation of childhood lymphoblastic leukemia. For this reason it becomes very relevant the management of periodontal diseases in association with serious systemic conditions: table. 1 shows clearly a diagram (1) containing the keys stages of management of pediatric patients with periodontal diseases. Potential systemic risk factors may be elicited when carrying out a thorough patient medical history (2). Examination of the periodontal tissues in the younger patient should be a routine part of the dental examination as depicted. Although periodontal diseases are more frequent in adult, there are few types of periodontal diseases that can affect children and adolescent. The American Academy of Periodontology (AAP) (3) recognizes four different entities: Chronic gingivitis, Early onset periodontitis, Necrotizing ulcerative gingivitis/periodontitis, Periodontitis associated with systemic diseases. The last one includes for example periodontitis associated with juvenile diabetes or the one called prepubertal periodontitis, known now as periodontitis associated with leukocyte adhesion deficiency. This is a disease that begins between the time of eruption of the primary teeth up to the age of four or five (3). The one we want to consider is the condition that we could meet during or after pediatric leukaemic treatment, both

chemo or radiotherapy, which induce typically vascular phenomena or gingival inflammations: we will analyze the most important features by reviewing literature and show the primary common treatment of periodontal problems due to childhood leukaemia. Generally Porphyromonas gingivalis, Bacteroides forsythus, and Actinobacillus actinomycetem comitans are the responsible anaerobe associated of the great varieties of periodontitis: most periodontal disease derived from, or is aggravated by, accumulation of plaque. If the plaque is stored may become tartar by simple calcification above or below the gum line: the plaque that collects on calculus exacerbates the inflammation. The consequent inflammation causes a cascade of events against gum and, chronically bone with loss of tissues and structures. Firstly the inflammatory reaction is associated with progressive loss of periodontal ligament and alveolar bone and, eventually, with mobility and loss of teeth (4).

A very classical manifestation of periodontal diseases due to oncological treatment is gingival bleeding in those patients with significant platelet dysfunction: this represents a sign of gingivitis correlated to platelet and vascular disorders. In some patients, more commonly in patients with monocytic and myelomonocytic leukemia, gingival infiltration with leukemic cells may result in gingival hyperplasia. In patients with neutrophil

Key words: Childhood cancer, acute lymphoid leukemia, periodontal lesions

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dysfunction or neutropenia, the inflammatory response may be limited or absent, leading to non-healing soft tissue lesions, and poor response to tissue therapy following dental procedures (5, 8).

At the level of the gingival and oral mucosa, very often the lesions show pictures of bleeding widespread, due largely to thrombocytopenia during periods of neutropenia and immunosuppression. The gingival bleeding is exacerbated when oral hygiene conditions are not optimal, or when patients cause trauma to the gums while platelet count is low.

Rinse with chlorhexidine and simple cleaning with cotton rolls soaked in mouthwash may be the best solution to this issue. Spontaneous gingival bleeding is present when the platelets are less than 20,000/mm³, related to thrombocyte and coagulation abnormalities and is a clinically relevant problem, especially in children during the change of dentition.

An intramuscular hematoma can easily develop even after minimal trauma, such as loss of a tooth (6).

This complication may occur with lockjaw, pain and difficulty in chewing, speaking and cleaning oral cavity. The treatment involves the oral local administration of tranexamic acid when local prevention measures are not enough.

At the same time there are also cases in which over viral infections may occur. Gingival ulcers may have infectious aetiology: local manifestations consist in diffuse, purple, "boggy" gingivitis, especially anteriorly, with multiple vesicles scattered across the oral mucosa and gingival. These types of lesions may be very painful and troublesome especially while speaking and eating. It could be followed by ulcers. Diagnosis is usually clinical. These ulcers may resolve by themselves and the pain can be treated with antipyretic analgesics such as paracetamol and adequate hydration.

For children with leukaemia with severe immunosuppression who may suffer severe consequent infections, antiviral drugs should be used. An efficient help to maintain oral hygiene and health is represented by aqueous chlorhexidine mouth wash.

There are also a lot of periodontal complications correlated to the GVHD: the periodontal infections, gingivitis or generalized periodontitis, are probably the most common diseases of patient with ALL. Patients should be carefully evaluated to find gingival outbreaks by probing the gingival pocket depth, mobility of teeth and intrasulcular bleeding (Fig. 1-2). The state of oral hygiene must be established through the analysis of bacterial pathogens and determining the state of periodontal health (9, 10).

When we are looking to people who have serious periodontal conditions but at the same time very low

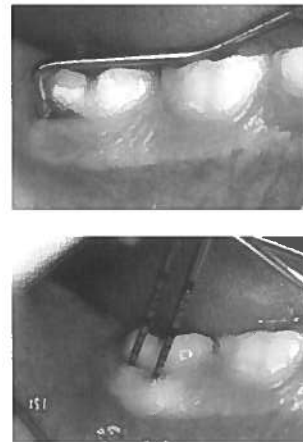
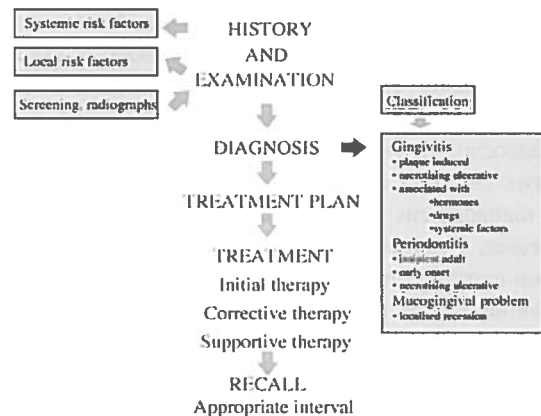


Fig. 1-2. Periodontal pocket and in a child with LLA.

Table I. Keys stages of management of pediatric patients with periodontal diseases.



platelet white blood cells counts, we can evaluate the administration of an antibiotic or alternatively determine a protocol divided into various steps that lead to improvement periodontal conditions.

So you can go, as soon as possible, to specific brushing protocols: after the gingival inflammation is normalized, we can introduce a professional oral hygiene protocol, prescribing before, during and after every action rinses with antimicrobial agents.

It's really important carefully investigating the haematological status of the patient before any treatment, in particular platelet, hemoglobin and white blood cells counts. It is absolutely important using the correct antibiotic prophylaxis when the children may have a risk of infection after dental treatment because of their status or neutropenic immunosuppression. The choice of

Table. II. AHA Antibiotic prophylaxis in cases of invasive dental procedures.

Situation	Agent	Regimen: Single Dose 30 to 60 min Before Procedure	
		Adults	Children
Oral	Amoxicillin	2 g	50 mg/kg
Unable to take oral medication	Ampicillin OR Cefazolin OR ceftriaxone	2 g IM or IV	50 mg/kg IM or IV
		1 g IM or IV	50 mg/kg IM or IV
Allergic to penicillins OR ampicillin—oral	Cephalexin [†] OR Clindamycin OR Azithromycin or clarithromycin	2 g	50 mg/kg
		600 mg	20 mg/kg
		500 mg	15 mg/kg
Allergic to penicillins OR ampicillin and unable to take oral medication	Cefazolin or ceftriaxone [†] OR Clindamycin	1 g IM or IV	50 mg/kg IM or IV
		600 mg IM or IV	20 mg/kg IM or IV

IM indicates intramuscular; IV, intravenous.
^{*}Or other first- or second-generation oral cephalosporin in equivalent adult or pediatric dosage.
[†]Cephalosporins should not be used in an individual with a history of anaphylaxis, angioedema, or urticaria with penicillins or ampicillin.

drug should be guided, and if possible, not performed on empirical basis.

Before performing invasive dental treatment, the antibiotic prophylaxis recommended from the National Cancer Institute (NCI) is:

-if the absolute neutrophil count is between 1000/mm³ and 2000/mm³ according to the regimen proposed by the American Heart Association;

-if the neutrophil count is below 1000/mm³: amikacin 150mg/m² 2 hour before surgery and ticarcillin 75mg/kg 30 minutes earlier.

Both repeated 6 hours after surgery.

The American Academy of Pediatric Dentistry (AAPD) recommends instead prophylactic treatment only if neutrophils are less than 1000/mm³ and proposed scheme AHA. (Italian Health Minister, 2010) (7). Table II shows the AHA Antibiotic prophylaxis in cases of invasive dental procedures.

DISCUSSION

The treatment of acute lymphoblastic leukemia is one of the great successes of medicine, which was considered, until the beginning of the eighties, a progressive fatal disease. This success can be associated to new effective types of therapy and the increased knowledge about the natural history of disease. The other reason of this success is the synergistic action of different specialists, every of those according to their own specialty, involved in different sectors working together towards the improvement of children's general health (11). In this regard, as we have seen before, the dentist can play an important role: he can

make an early diagnosis by examining the appearance of the oral cavity, for example in the case of a suspected bleeding, both during the therapy, until bone marrow transplantation, because the oral care can allow a better therapeutic response. The treatment of the oral cavity in leukemic patients provides two additional advantages. It can improve general conditions, so that the quality of life of the patient, by removing some obstacles to normal life and allow appropriate nutrition. A less known but increasingly important target is the transition from pediatric to internist team. This transition may have adverse effects if it is not conducted with appropriate and necessary precautions.

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