



Oral and Dental Considerations in Leukemic Patients - An Updated Review

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Abstract

The pediatric dentist plays an important role in the prevention, and treatment of oral and dental problems and sometime is the first to diagnose the underlying disease, that can compromise the child’s health and quality of life. Therefore, the dental community should be aware of the oral manifestations of leukemia and treatment of patients with leukemia. This article discusses the dental care of the pediatric leukemic patients.

Keywords: Leukemia, Oral Manifestations, Dental Treatment

Introduction

Leukemia is a group of malignant disorder, affecting the blood and blood forming tissue of the bone marrow lymph system and spleen. The word Leukemia comes from the Greek *leukos* which means “white” and *aima* means blood. It is first recognized by Virchow and Bennet in 1845 and constitutes approximately 30% of all childhood cancers and acute lymphoblastic leukaemia (ALL). ALL is the most common type of malignancy encountered in children^[1,2]. Among various leukemia categories, it was the first leukemia that could be cured in a majority of children.

Classification

Leukemia is mainly classified as (acute or chronic) according to the duration and the type of cell affected (myeloid, lymphoid, or monocytic)³. Acute lymphoblastic leukemia (ALL) accounts for 1/4th of all childhood cancer and 3/4th of all malignant leukemias (5). It is considered as the most common childhood leukemias in Saudi Arabia representing 75% of all newly diagnosed leukemia⁴. Although the etiology of leukemia is still unknown. Genetic alteration and susceptibility, hereditary abnormalities associated with an increased incidence of leukemia are Down’s syndrome, Fanconi’s aplastic anemia, Trisomy 13 (Patau’s Syndrome) etc. and environmental factors, such as: parental smoking and alcohol consumption, exposure to ionizing radiation, non-ionizing electric fields are potential factors that may lead to development of childhood leukemia.⁵

Pathophysiology

White blood cells help the body to fight with infection. In leukemia patients, there is an abnormal production of white blood cells and stem cells turn into lymphoblast (leukemia cells). This causes backlash on the body by decreasing the number of red blood cells and platelets the bones can produce. Red blood cells helps in clotting of blood, infection resistance, and iron retention.⁶

Without functional red blood cells, heavy bleeding from a simple wound or anemia is possible. An excess of myoblasts in the body causes acute myelogenous leukemia. Myoblasts, like lymphoblast are abnormally produced white blood cells that cause fast acting deterioration in patients. Since children's bodies are in growing process and becoming accustomed to variations, leukemia in children tends to be acute and usually become advanced/terminal.⁷ Chronic leukemia is generally diagnosed in patients who have reached adulthood.

Signs and Symptoms

The most common signs and symptoms of ALL are anorexia, irritability, lethargy, anemia, bleeding, petechiae, fever, lymphadenopathy, hepatosplenomegaly, and bone pain and arthralgias caused either by leukemic infiltration of the perichondral bone or joint or by leukemic expansion of the bone marrow cavity leading to disability in walking in children.⁸

Oral Manifestations

Oral signs or symptoms suggestive of leukemia have been reported in as many as 75% of adults and 29% of children with leukemia. The incidence of ALL peaks at 3 years of age, when pre-existing inflammatory and degenerative changes are comparatively less frequent. The intraoral manifestations of ALL at the time of diagnosis are Lymphadenopathy which is the most frequently encountered oral symptom suggestive of leukemia; others include petechiae, ecchymoses, ulcers, bleeding, and gingival abnormalities. Manifestations seen occasionally are cranial nerve palsies, chin and lip paresthesia, odontalgia, jaw pain, loose teeth, extruded teeth and gangrenous stomatitis. Patients with leukemia may have periods of remission for as long as five years; during the remission periods, meticulous oral hygiene

should be maintained as leukemia appears to exacerbate marginal periodontal diseases. The gingival hyperplasia is usually generalized and differs in severity.

Direct invasion of tissue by an infiltrate of leukemic cells can produce gingival hypertrophy. Such gingival changes can occur despite of excellent oral hygiene. Leukemic cell can infiltrate along vascular channels causing strangulation of pulpal tissue and abscess formation. Moreover, skeletal lesions are also common in childhood leukemia

Manifestations in jaws include generalised loss of trabeculation, destruction of the crypts of developing teeth, loss of lamina dura, widening of periodontal ligament space. Some studies correlate between ALL treatment and the frequency of dental anomalies. In three cross-sectional studies done by Minicucci et al. 2003⁹, Maciel et al. 2009¹⁰ and Khojastepour et al. 2014¹¹ performed on 76, 56 and 25 ALL pediatric patients respectively. The clinical and radiographic examination showed that 82%, 80% and 28% of the same patients had at least one dental anomaly, respectively. Therefore, this re-sult lead us to conclude that the treatment of ALL significantly increase the number of dental anomalies.

Dental Management of Patients with Leukemia

A thorough history is needed prior the dental treatment. (information on the underlying disease, time of the diagnosis, modalities of treatment and etc).

Careful examination of oral cavity is necessary and to identify, stabilize or remove any existing source of infection and local irritants including orthodontic appliance which might cause discomfort in the oral cavity.

Any existing lesions that might normally lie dormant can flare up and become life threatening, that should be carefully examined

Educate the patient and parents about the importance of optimal oral care in order to minimize oral problems and discomfort before, during, and after treatment and about the possible acute and long-term effects of the therapy in the oral cavity and the craniofacial complex. Hematological information is needed before any invasive procedures (such as extractions) as leukemia patients have higher bleeding tendencies and they are liable to infections.

Before the appointment –preferably on same day- a blood cell profile (complete blood count) and platelet count should be taken.

Preventive oral care is important in leukemia patients and special emphasis is placed on the initiation and maintenance of a comprehensive oral hygiene regimen.

Early intervention is important to reduce the possible complications. Soft nylon toothbrush is recommended for removal of plaque.

A platelet level of 100,000/mm³ is adequate for most dental procedures (TABLE 1) Routine preventive and restorative treatment, including nonblack injections, may be considered when the platelet count is at least 50,000/mm³.¹²

Pulp therapy on primary teeth is contraindicated in any patient with a history of leukemia. Endodontic treatment for permanent teeth is not recommended for any patient with leukemia who may have a chronic, intermittent suppression of granulocytes.¹³

Table 1. Clinical Importance of Platelet Count

Count (cells/ mm ³)	Significance
150,000 – 400,000	Normal
50,000- 150,000	Bleeding time is prolonged, but patient would tolerate most routine procedures
20,000-50,000	At moderate risk for bleeding:defer elective surgical procedures

<20,000 At moderate risk for bleeding:defer elective surgical procedures.

Fissure sealants on the molars to reduce dental caries is necessary. Fixed and removable orthodontic appliances are not recommended for patients with poor oral hygiene.

Deep lesions can bleed spontaneously or as a result of topical application of bovine thrombin or Avitene, and oral adhesive for protection may be beneficial.

Patient who is in relapse, require close observation. Fungal infections like Candidiasis are common in children with leukemia. In such cases, topical use of nystatin can be beneficial

Nystatin oral suspension, 1000,000 U/mL

Swish 5ml for 5 minutes and then swallow

Repeat every 6 hours, continue for 48 hours after lesions disappear.

Leukemia patients should maintain their oral hygiene by:

- Brush twice daily using a soft toothbrush to reduce the risk of significant bleeding and infection of the gingival.
- Attending the dental appointments regularly to monitor their oral condition.
- Remove plaque effectively to prevent formation of dental caries
- Rinse after meal to avoid accumulation of plaque/food debris

Conclusion

The participation of a pediatric dentist in the treatment is of prime importance in reducing the complications before, during, and after leukemic treatment in children. Education of care taker and child's parents is important to minimize discomfort and increase the chances for a successful outcome of treatment. Discussion with caretakers and patient should include dietary habits,

medications, and nutritional supplements Dentists should be able to clearly recognize oral manifestations of leukemia as the dentist sometimes is the first health care professional that discovers acute leukemia in children. Importance of oral hygiene measures should be explained to parents. Such a preventive and therapeutic approach may prevent oral and systemic complications and improve quality of life in children with leukemia.

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