Oral Health Status in Children with Acute Lymphoblastic Leukemia and Lymphoma

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ABSTRACT

We evaluated the oral health status of 85 acute lymphoblastic leukemia (ALL)/lymphoma pediatric patients who received remission-induction and maintenance chemotherapy and 85 age and sex-matched healthy children with the criteria of World Health Organization (WHO) and to determine the prevalence and distribution of dental problems in order to constitute preventive dentistry precautions in this study. The gingival tissues were scored with Community Index of Periodontal Treatment Necessity (CPITN) and dmf-t and DMF-T indices were used for caries evaluation. In the study group, malocclusion was found in 24 patients (28.2%). CPITN was scored as follows in the study group; 11% of the patients had healthy gingiva (Grade 0), the presence of plaque (Grade I) 79% of the patients, the presence of calculus (Grade II) 10% of patients were observed. Nevertheless, mucositis was found with various grades in 9 patients who received chemotherapy. Decayed teeth were found in the 76 patients and in 45 healthy children. 91.7% of patients and 52.9% of children needed dental treatment were determined. The DMF-T and dmf-t scores showed that ALL/lymphoma patients had more decayed and needed more dental treatment, missing or filled teeth both in their deciduous ($p < 0.001$) and permanent ($p < 0.05$) dentition when compared to systemically healthy children.

Key Words: Oral health, Dentition, ALL, Lymphoma, Children.

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INTRODUCTION

ALL and lymphoma are the most common childhood malignancies. Over the past 20 years, striking advances have been performed in childhood cancer treatment, which had caused an increasing number of a young population who had recovered or completely cured off the malignancy[1]. It has been reported that with current treatment modalities, 80% long-term survival could be expected in patients who had been diagnosed before age 10[2]. However, aggressive chemotherapy and irradiation may significantly affect general health and quality of life of survivors. Therefore, long term effects of anti-cancer treatment and studies on the improvement of quality of life have been subject to several papers within last 10 years.

Infection continues to be the leading cause of morbidity and mortality in patients with ALL/lymphoma. It has been reported that 24% of life-threatening infections arise from oral sites[3]. Early dental intervention may significantly reduce oral complications associated with myelosuppressive cancer treatment in ALL/lymphoma patients[4]. It is therefore crucial to evaluate the oral health surveys and to eliminate potential sources of infection in mouth in these patients concurrent with their medical therapy.

The aim of this study was to evaluate the oral health status of ALL/lymphoma patients with the criteria of World Health Organization (WHO) and to determine the prevalence and distribution of dental problems in order to constitute preventive dentistry precautions[5].

PATIENTS and METHODS

The study group included 85 ALL/lymphoma patients who received chemotherapy in Çukurova University Pediatric Hematology/Oncology department. The distribution of patients by age, sex, type and the stage of malignancy are shown in Table 1 (The distribution of the study group by age). The control group was consisted of 85 systemically healthy children who were at the same age and sex as in the study group. Both groups received dental examination with the criteria of WHO and malocclusion, gingival tissues, caries, hypoplasia of teeth, florozis and mucositis were evaluated. The evaluation criteria were as follows:

Malocclusion (abnormal closure of the jaws and teeth crowding) was diagnosed as none-mild severe. The gingival tissues were scored with Community Index of Periodontal Treatment Necessity (CPITN). Grade 0 were for healthy tissues. The presence of plaque around teeth were scored as Grade I. Patients with calculus received Grade II. Pocket depths of 4-5 mm were scored Grade III and advanced pocket depths received Grade IV. The status of teeth were evaluated with the sum of decayed (D), missing (M) and filled (F), teeth (T) which consisted DMF-T index for permanent dentition and dmf-t index for deciduous dentition.

The criteria for florozis, hypoplasia of teeth and mucositis were none-mild-severe.

According to the summary of data, the prevalence of malocclusion, caries and gingival disease were found and the percentage of children who needed dental treatment was determined. The statistical analysis of data was done by using student-t test.

Table 1. The distribution of study group by age, sex, type and stage of the malignancy

		Female	Male	Total	Mean age
ALL	Remission induction	20	23	43	6.6
	Maintenance	11	13	24	8.3
Lymphoma	Remission induction	6	6	12	7.4
	Maintenance	1	5	6	9
Total		38	47	85	7.8

RESULTS

Oral health status of 85 ALL/lymphoma patients was compared with 85 systemically healthy children in this study. No statistical difference was found in the comparison of malocclusion (p> 0.05) as shown in Figure 1. (Malocclusion analysis).

Significant differences between the ALL/lymphoma patients and the control group were recorded with CPITN scores, which revealed the status of gingival tissue (Figure 2) (Gingival tissues-CPITN scores). While 11% of the study group had healthy gingiva (Grade 0), this ratio was 61% in the control group and the difference was statistically significant (p< 0.0001). Similarly the presence of plaque (Grade I) was observed in 78% of the study group and 36% of the control group. The difference was statistically significant (p< 0.001). No difference was noted for Grade II, which showed the presence of calculus.

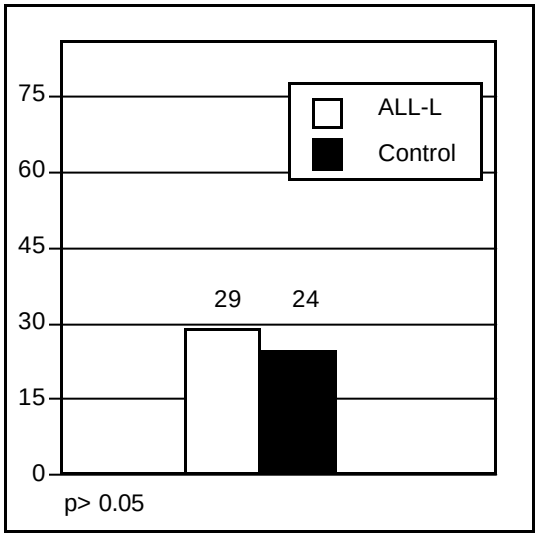

Figure 1. Malocclusion analysis.

The DMF-T and dmf-t scores showed that ALL/lymphoma patients had more decayed, missing or filled teeth both in their deciduous (p< 0.001) and permanent (p< 0.05) dentition when compared to systemically healthy children (Figure 3) (Decayed, missing and filled teeth-DMF-T and dmf-t scores).

Varying degrees of mucositis were observed in 9 ALL/lymphoma patients and additional 5 had hypoplasia of their teeth. No florozis was observed in any groups.

The prevalence of malocclusion, decay and gingival disease and the percentages of persons needing dental treatment are shown in Table 2 (Prevalences of malocclusion, decay, gingival disease and the over-all percentage of children who need dental treatment). It has been found that 91.7% of ALL/lymphoma patients needed at least one type of dental treatment modalities (p<

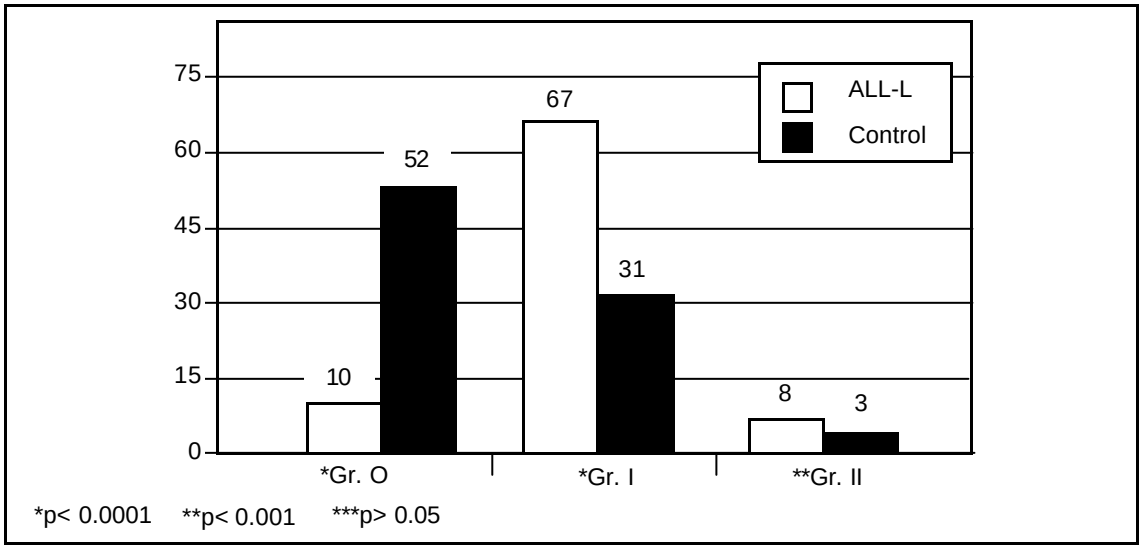

Figure 2. Gingival tissues-CPITN scores.

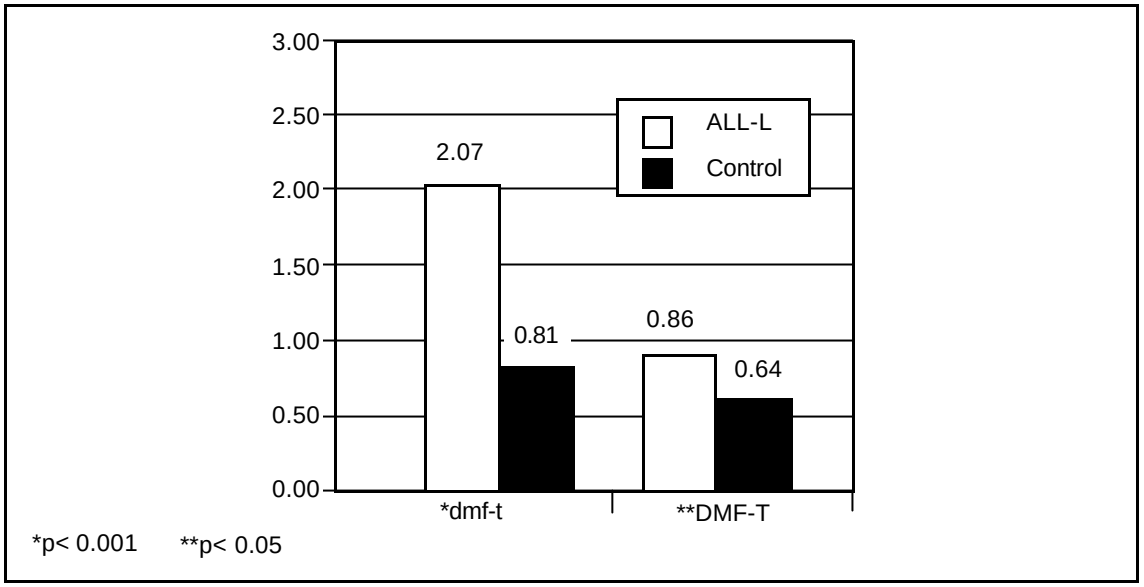

Figure 3. Decayed, missing and filled teeth-DMF-T and dmf-t scores.

0.001).

DISCUSSION

The long-term effects of chemotherapy and/or irradiation on oral soft tissues has been well defined in the literature; however the effects of these anti-cancer treatment on general oral and dental health is yet to be explained. DePaolo et al have mentioned that besides preventing oral complications, the self-esteem of the patients with hematologic malignancies greatly improves by correcting the facial esthetics with dental care[3]. Another important reason for dental care relates to the improvement of chewing ability of the patient to achieve sufficient enteral nutrition[3].

Similar or higher prevalence of dental diseases is reported for children with leukemia/lymphoma when compared to systemically healthy children[6-9]. 91.7% of ALL/ lymphoma patients needed dental treatment in this study which is significantly higher than previous studies. This can partly be explained by long-term dental complications of oncologic therapy including abnormal dental and craniofacial development at any point prior to maturation such as hypodonti, microdonti and enamel hypoplasia and variations in quantity, complexity and quality of the oral flora during chemotherapy, which can make the teeth more susceptible to caries[9-11]. However, socio-economic factors such as the income and the educational status of the parents, the place of residence, nutrition and oral hygiene motivation should also be considered. Another reason of high prevalence of dental problems in leukemia/lymphoma patients

Table 2. Prevalances of malocclusion, decay, gingival disease and the over-all percentage of children who need dental treatment

	Malocclusion	Gingival disease	Decay	Percentage of dental treatment need
ALL-L (n= 85)	29 (34.1%)	75 (88%)	76 (89.4%)	78* (91.7%)
Control (n= 85)	24 (28.2%)	24 (28.2%)	45 (52.9%)	49 (57.6%)

*p< 0.001

might be the fear of dentists to treat these patients due to the high risk of infection and bleeding.

Dental caries and periodontal diseases are both infectious in nature and may cause significant morbidity and mortality in these patients during periods of chemotherapy, in which bone marrow is suppressed and the subjects are more susceptible to infection. The timing of dental treatment in cancer patients is, therefore, important and should be before chemotherapy or irradiation to prevent complications arising from oral sites[3,4].

In conclusion, the findings of this study showed that children with ALL/lymphoma are at high risk of dental problems which may affect their successful medical therapy. Therefore we recommend frequent dental examinations and intense oral hygiene program before, during and after chemotherapy in these patients.

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