

Periodontal condition in children with hematological diseases

Abstract

Introduction: Leukemia and lymphoma are both types of blood cancer that are characterized by an abnormal and uncontrollable proliferation of white blood cells. Regarding their oral health, the attention given to these patients can positively influence prevention or treatment of periodontal diseases.

Objective: determine the periodontal condition in children with diagnosis of either leukemia or lymphoma.

Material and methods: descriptive, cross-sectional and prospective study done in patients aged 2 to 17 years, with leukemia or lymphoma diagnosis that attended the hematology service during August-September of 2018. Periodontal condition and oral hygiene quality were evaluated using the Community Periodontal Index (CPI) and the Simplified Oral Hygiene Index (OHI/S) respectively. It was accepted by the Local Research Committee, hospital director, and had signed informed consent and agreement of the children and their guardians. Descriptive statistics was used, with measures of central tendency, percentages and frequencies with the SPSSv.21 program.

Results: A total of 35 patients were included, finding some type of periodontal involvement in 57.14%, of which 45.7% had bleeding, dental calculus and periodontal bags measuring less than 3,5mm. Poor oral hygiene was found in 85.7%.

Conclusions: most children diagnosed with leukemia and lymphomas have periodontal diseases and a deficient oral hygiene; so we recommended paying special attention to prevent the onset of periodontal diseases, and if not, treat them promptly.

Keywords: leukemia, lymphoma, periodontitis, gingivitis, oral ulcer

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Introduction

Leukemias and lymphomas are characterized by abnormal and uncontrolled proliferation of white blood cells. Patients often suffer alterations in the oral cavity, mainly having an infiltration of leukemic cells in their gums.^{1,2} Although periodontal pathologies are mostly caused by the accumulation of dentobacterial plaque on the teeth surfaces or soft tissues, an imbalance in the host's defense mechanism often leads to periodontal alterations.^{3,4} This instability in the immune system can be found in various systemic diseases, such as leukemias and lymphomas.⁵ Therefore, adequate care for patients with such hematological diagnoses can positively influence the prevention or treatment of periodontal diseases.^{6,7} Worldwide, acute leukemias are the most common childhood cancers; they account for about 30% of all cancers in children.⁸⁻¹¹ A study conducted in Mexico concluded that, in a cohort of 112 patients with acute lymphoblastic leukemia, oral mucositis was the third most common infectious complication, appearing in 10.65% of the cases. Meanwhile, a study at the National Institute of Pediatrics (Instituto Nacional de Pediatría) in Mexico City, found that stomatological manifestations that required specialized treatment, such as gingivitis and periodontitis, were common among patients with their most frequent pathologies.¹² Another study, conducted in the same hospital, that centered around 17 patients with acute lymphocytic leukemia (ALL) that underwent intense chemotherapy for the first time, determined that 46.2% had some type of oral injury; 15.4% had oral mucositis, 7.7% oral thrush, 7.7% herpes virus infection; 23.1%, oral bacterial infection and 76.9% had poor oral hygiene.¹³ At a national and institutional level, it is still necessary to clarify the frequency of appearance and the severity of the periodontal alterations associated with these disorders using the CPI. Also, the quality of oral hygiene in patients established through

IHOS has only been done in a select few investigations. It is therefore necessary that the frequency and type of lesions that occur in the oral mucosa in these patients be determined. Given these circumstances, the objective of the study was to know the periodontal condition in children with a diagnosis of leukemia or lymphoma who attend the hematology service in this hospital.

Material and methods

A cross-sectional, observational, prospective and descriptive study was carried out in patients aged 2 to 17 years with diagnosis of either leukemia or lymphoma that attended the hematology service in the GPH/FM No. 31 of IMSS in Mexicali, Baja California during August and September of 2018. Convenience sampling was used. Inclusion criteria were: age 2-17 years, diagnosis of leukemia or lymphoma and willingness to participate in the study. Patients were excluded if they had incomplete medical history. The measuring instruments were: the Community Periodontal Index (CPI) and the Simplified Oral Hygiene Index (OHI-S).¹⁴ The CPI evaluated whether periodontal tissues were healthy or not, as well as the degree of involvement of periodontal disease. For its registration, the presence or absence of bleeding, dental calculus, periodontal pockets and their depth were taken into account. A total of 6 teeth were analyzed (1 per sextant) with the help of a dental mirror and the probe established by the World Health Organization (WHO). Each tooth was assigned a code (from 0 to 4 and 9). To obtain the total, only the highest code was taken as reference.

Their quality of oral hygiene was evaluated with the OHI-S, which takes into account the degree of oral detritus and dental calculus. Six teeth were analyzed in total (1 per sextant) with the help of an oral mirror. Each tooth was assigned two codes (both from 0 to 3), one

for each item (detritus/calculus). To obtain the IHOS, the averages of oral detritus and dental calculus were calculated and both values were added. The final value was interpreted using the scale: excellent (0), good (0.1-1.2), regular (1.3-3.0), and bad (3.1-6.0). Lastly, an examination of the buccal mucosa was performed using an oral mirror and observing the commissars and labial mucosa, vestibular sulcus, gums, alveolar crests, tongue, floor of the mouth, and hard and soft palate. The presence or absence of lesions, as well as the type of lesion and its location were recorded. The data obtained through interrogation and oral examination was compiled in individual record sheets, as well as the sequence of treatments performed.

The present study followed the guidelines of the Declaration of Helsinki, current international codes and standards of good clinical research practice, Mexico’s General Health Law and the institute’s own research guidelines. It was carried out with prior acceptance by the local research committee and the patients’ parents/guardian authorization through written informed consent and willingness of the patients. Patient confidentiality was kept. This study had minimal risk since the oral cavity was checked using non invasive techniques.

Table 1 Community Periodontal Index scores by gender

Code	Clinical findings	Gender		Total
		Male	Female	
0	Healthy	9	6	15
1	Bleeding, without dental calculus or periodontal pockets	1	1	2
2	Bleeding, dental calculus or periodontal pockets <3.5mm	11	5	16
3	Bleeding, dental calculus or periodontal pockets >3.5mm and <5.5mm	2	0	2
4	Bleeding, dental calculus or periodontal pockets >5.5mm	0	0	0
N/A*	Teeth of interest for evaluation are absent	9	9	9
Total		23	12	35

*N/A: not available

Table 2 Quality of oral hygiene according to OHI-S

OHI-S category	Number of patients	Percentage
Excellent	0	0
Good	5	14.3
Regular	14	40
Bad	16	45.7
Total	35	100

OHI-S: Simplified Oral Hygiene Index

Discussion

The mean age of the 35 children diagnosed with Leukemia and Lymphoma who attended the unit was 9.23 ± 4.07 years, similar to that reported by several authors, where the mean age was 5.8 to 7.8 years.^{15,16} Male gender was predominant, constituting 65.7% of this cohort, similar to that found by several authors.^{8,10} In contrast, in the study by Parra et. al.,¹⁵ female patients constituted 53.1% of the patients. While examining the CPI, code 2 and code 0 were the most common. There is no registry of studies that use this scale to evaluate pediatric patients with hematological diagnoses; however, the finding made by Teja et al.,¹² in his study carried out in the National Institute of Pediatrics, in which he found that patients with ALL had

The variables were analyzed with descriptive statistics, measures of central tendency, percentages and frequencies with the statistical program SPSS 21.

Results

A total of 35 patients were included. The mean age was 9.23 ± 4.07 years. Male patients were more prevalent (65.7%, n=23) than female (34.3%, n=12). Regarding treatment phase, 60% (n=21) of patients were currently under chemotherapy and the remaining 40% (n=14) were under surveillance. The most common CPI codes were codes 2 (bleeding, presence of dental calculus and periodontal pockets less than 3.5mm) and code 0 (no healthy). Table 1 Bad oral hygiene was present in 45.7% (n=16) of patients, while regular oral hygiene was present in 40% (n=14). Table 2 Concerning CPI codes, 0 and 2 were the most common; majority of the 15 children with code 0 had a regular oral hygiene. Meanwhile, most of the children with code 2 had a bad oral hygiene. Almost a third of patients (31.4%, n=11) of patients presented ulcers in oral mucosa; 7 of these were located in the vestibular sac fundus, and in 4 patients at the bottom of the vestibular sac and the labia.

stomatological manifestations that require specialized treatment, such as gingivitis and periodontitis.¹² On the other hand, Parra et. al.,¹⁵ reported that 37.5% of the patients presented spontaneous bleeding in 1 or 2 dental organs, and only 3.5% presented generalized spontaneous bleeding.¹⁵ These periodontal alterations coincide with the oral manifestations presented by children cataloged in codes 1 to 3 in our study. Regular and poor oral hygiene were common; this is similar to that found by several studies.^{13,17} This supports the theory that poor oral hygiene among this type of patients is due to the oral discomfort inherent to their disease. This mechanism is intensified by the mechanical drag performed during the brushing technique.

Ironically, the poor quality of oral hygiene in these patients can undoubtedly aggravate the oral manifestations that prevent patients from brushing their teeth correctly and regularly. Oral ulcers were located in 31.4% of the patients, vastly greater than similar studies, where only the minority of the studied population presented ulcers (from 4 to 9.4%).^{15,18} In the study population, majority of the 16 children with code 2 presented poor oral hygiene. This coincides with the findings found in the study by Carbajal et. al.¹⁷ This result suggests that the periodontal condition of a patient may be associated with their quality of oral hygiene. Therefore, it is important to pay special attention to educate patients with leukemia or lymphomas in order to treat the oral manifestations their diagnosis entails and thus prevent them from further complications.

Conclusion

The frequency of periodontal disease and the quality of oral hygiene in patients with leukemia and lymphoma are similar to those reported nationally and internationally. To our knowledge, only this study has evaluated the periodontal condition with the CPI in this type of patients.

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Conflicts of interest

We have no conflicts of interest to disclose.

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