Evaluation of the Oral Health Status in Egyptian with Acute Leukemia by Risk Stratification and Impact of an Oral Hygiene Education Program

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Introduction

Acute lymphocytic leukemia (ALL) is the most frequent form of all childhood cancer. Intensive regimens in children improve the 5-year event-free survival (EFS) to reach ~ 90%(1). Dental caries and gingival disease is common in Egyptian children. Better oral health-related attitudes, and knowledge, mother's education level, were factors that impacted the behaviors, attitudes, and knowledge of the mothers in healthy children(2).

Aim

The aim was to evaluate the dental education program and intervention on outcome in children suffered of ALL and AML, according to their risk stratification; assessing chemotherapy discontinuation, morbidity and mortality.

Objectives

Apply an integrated dental assessment program in the care of children with acute leukemia.

Methods

This study was conducted in two stages. Stage 1 started on June 2022 and involved oral assessment of 114 registered Egyptian children, with acute leukemia, aged 4 -12 years, attending the Oncology Clinic of the Children's Hospital, Ain Shams University. Stage II of the study was conducted quarterly for 12 months including reinforcement of the education program. In stage I, a comprehensive medical and dental history were obtained from all patients. The patients were examined and evaluated according to criteria of the WHO for the assessment of dental caries. The DMFT index for permanent teeth, and the deft caries index for primary teeth were used. The patient's oral hygiene conditions were examined and evaluated by OHI-S(30), which is composed of the oral debris index and the calculus index. We placed the 114 children into three groups; only 88 children had continued the 12 months follow up: Group A, non-intervention (n=22); Group B, ALL intervention (n=48) and Group C. AML intervention (n=18). The intervention group, which consisted of 66 children, received educational material, professional bacterial plaque removal; if the gingival health was poor, both antibiotic therapy and platelet transfusion (if PC<20,000/mm3) cover were used to control bleeding with the use of antibacterial mouthwashes. They also received in-office fluoride treatment, a soft toothbrush, fluoride toothpaste and individualized oral hygiene to both the child and parents. The 22 children in the non-intervention group received only the necessary clinical treatment as the intervention group. In stage II, effectiveness of the oral hygiene education program was evaluated for those who survived in both groups by performing identical indices and comparing the outcomes with the baseline data.

Results

The study included 51 children with standard risk ALL and mean age of 6 years, 31 with high risk ALL and 32 with AML, the median(IQR) age with higher in high risk ALL (9(1.4)years) as well as the initial leucocytic count 32(18) x10^3). Table (1) shows cumulative frequencies of chemotherapy related oral manifestations over 12 months and table (2) shows the results of the mean DMFT and deft values Oral hygiene performance: results were analyzed from the questionnaire with regard to the method of oral hygiene practice, if any was performed. Only 80.3% were on regular oral hygiene practice after intervention. Chi- square test was applied to compare different treatment methods within both groups, no significance was detected in use of a particular method of oral hygiene care.

Table 1: Oral manifestations; cumulative frequencies in intervention (I) and non-intervention (non-I) over 12 months

Oral manifestation	Intervention (no. = 82)			P. value	Non-intervention (no. = 82)			P. value
	Standard ALL No. = 32	High risk ALL No. = 21	AML No. = 25		Standard ALL No. = 14	High risk ALL No = 10	AML No. = 7	
Mucositis	12 (31%)	12 (57%)	13 (52%)	0.321	7 (50%)	7 (70%)	7 (100%)	0.068
Ulcers	13 (34%)	11 (52%)	12 (48%)	0.685	8 (57%)	8 (80%)	6 (86%)	0.296
Herpes	11 (28%)	11 (52%)	9 (36%)	0.380	7 (50%)	7 (70%)	6 (86%)	0.247
Candidiasis	9 (22%)	9 (43%)	10 (40%)	0.480	6 (43%)	6 (60%)	6 (86%)	0.170
Bacterial infections	7 (19%)	8 (43%)	9 (36%)	0.360	5 (36%)	6 (60%)	5 (71%)	0.246
Bleeding	13 (34%)	13 (62%)	12 (44%)	0.315	8 (57%)	9 (90%)	7 (100%)	0.044

Table 2: Mean DMFT and deft in intervention (I) and non-I groups at 12 months.

Group	Caries index	DMFT	deft
A Non-I	Mean ± SD	3.05 ± 1.42	5.71 ± 2.85
B ALL (I)	Mean ± SD	3.07 ± 1.23	5.84 ± 2.95
C AML (I)	Mean ± SD	3.35 ± 1.37	5.94 ± 2.62
P-value		0.270 (NS)	0.920 (NS)

Summary

A team effort among parents, children, oncologist, and dentist can aid in improving the oral health with less oral infections and less interruption of chemotherapy.

Discussion

This study is unique in reporting complications like uncontrollable hemorrhage or life-threatening hematomas from tooth extraction, that participated in the exaggeration of dental problems in case of severe thrombocytopenia. The mean oral hygiene index simplified value in children with acute leukemia in group A and the mean OHI-S value in group B & C characterize the dental health situation of these to be in the higher end of the 'fair' level of oral hygiene. This reflects the unperceived importance of good oral health to prevent any unnecessary bleeding. When the mean OHI-S was reassessed after 12 months of good oral hygiene. There is fear of children, their families, oncologist and dentists from attempting oral care, the results of this work clearly elaborate that oral healthcare knowledge and dental services are not readily available to the vast majority of children.

References

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