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Chair and Department of Paedodontics, Medical University of Lublin

ELŻBIETA PELS, MARIA MIELNIK-BŁASZCZAK, DOROTA KRAWCZYK

State of oral health in children with lymphoblastic leukemia

Leukemias are neoplastic diseases of the white blood cells that produce dominant cellular lines typical of the early stages of hematopoesis present in the bone marrow and blood. Leukemic cellular clones can create infiltrations on different organs. The development of leukemia is connected with simultaneous occurrence of several etiological factors including altered gene structure, viruses – mostly retroviruses, individual predisposition associated with the disorders of immune control mechanisms as well as external factors, e.g. ionic radiation, chemical agents, impaired composition of the environment. Generally, children suffer from acute lymphoblastic leukemias originating from early stages of B and T lymphocytes development.

The purpose of the study was to evaluate the state of deciduous and permanent teeth, marginal periodontum and oral hygiene in children with acute lymphoblasic leukemia starting treatment at the Clinic of Hematology and Oncology, Clinical Children's Hospital in Lublin.

MATERIAL AND METHODS

Clinical examination covered 39 children suffering from acute lymphoblastic leukemia 3–16 years old, starting treatment at the Clinic of Hematology and Oncology. The study also included a group of 39 healthy children who were the controls. Clinical examination evaluated the following parameters of dental caries: frequency of dental caries affecting deciduous and permanent teeth, index of dmft and its components dt, mt and ft, dmfs and its components ds ms and fs, index DMFT and its components DT, MT and FT, DMFS and its components DS,MS and FS

In both groups of children the state of oral hygiene was evaluated by means of oral hygiene index (OHI) according to Green and Vermillion. The evaluation of periodontum included the plaque index (Pl. I) according to Silness and Löe used to assess the depth of plaque deposited on the neck with regard to four surrounding gingival surfaces: buccal, lingual, medial and lateral and the gingival index (GI) according to Löe and Silness.

The results were analyzed statistically on PC (program STATISTICA).

RESULTS

The results are presented in Figure1 and Tables 1–5. Dental caries frequency in deciduous teeth in the group of children with lymphoblastic leukemia was 80.00% and in the controls it was 86.66%. Dental caries frequency in permanent teeth in the group of children with lymphoblastic leukemia was 94.44% and in control groups it was 100% (Fig. 1).

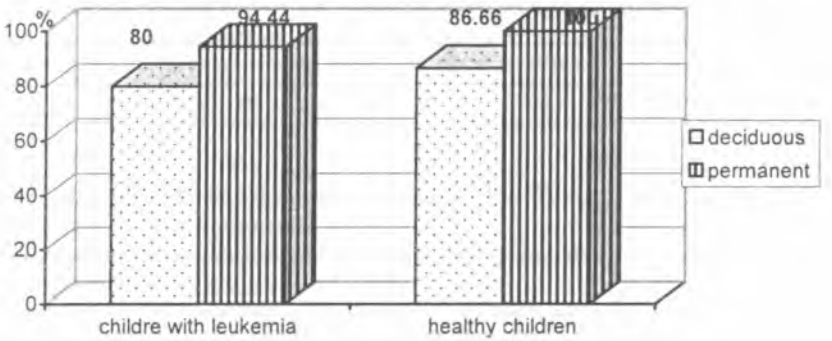

Fig. 1. Caries frequency in deciduous and permanent teeth

Table 1. dmft index in children with lymphoblastic leukemia and healthy controls

Group examined	Number of examined	dt			mt			ft			dmft		
		M	Chi^2	p	M	Chi^2	p	M	Chi^2	p	M	Chi^2	p
Children with leukemia	30	4.53	2.4	0.12	0.1	0.74	0.39	0.6	0.42	0.52	5.23	2.41	0.12
Healthy children	30	5.77			0.16			0.63			6.53		

Table 2. dmfs index in children with lymphoblastic leukemia and healthy controls

Group examined	Number of examined	ds			ms			fs			dmfs		
		M	Chi^2	p	M	Chi^2	p	M	Chi^2	p	M	Chi^2	p
Children with leukemia	30	8.86	2.4	0.12	0.5	0.74	0.39	0.73	0.42	0.52	10.1	4.27	0.03
Healthy children	30	13.2			0.83			0.93			14.97		

Table 3. DMFT index in children with lymphoblastic leukemia and healthy controls

Group examined	Number of examined	DT			MT			FT			DMFT		
		M	Chi^2	p	M	Chi^2	p	M	Chi^2	p	M	Chi^2	p
Children with leukemia	18	3.88	1.8	0.18	0.33	2.11	0.14	1.5	1.03	0.31	5.72	3.70	0.05
Healthy children	18	2.66			0			0.44			3.11		

Table 4. DMFS index in children with lymphoblastic leukemia and healthy controls

Group examined	Number of examined	DS			MS			FS			DMFS		
		M	Chi^2	p	M	Chi^2	p	M	Chi^2	p	M	Chi^2	p
Children with leukemia	18	6.06	1.08	0.3	2.27	3.27	0.07	1.28	0.47	0.5	9.61	1.0	0.31
Healthy children	18	4.39			0			0.72			5.11		

The development of dental caries in deciduous and permanent teeth was advanced in both groups, which is expressed by high dmft and DMFT components. In deciduous teeth there was observed insignificantly less dental caries in the group of children with leukemia than in the control group. However, especially annoying is the high value of d components in both groups, which is the evidence of active, untreated tooth caries and low index of treatment. The values of parameters evaluated in deciduous teeth are presented in Table 1 and Table 2. In permanent teeth there observed decidedly more active dental caries – DT value. Children with leukemia had significantly high DMFT index. The remaining parameters (MT, FT) were insignificantly higher in the study group than in the control group. Table 3 and Table 4 present the results of examination of permanent teeth.

In the group of children with lymphoblastic leukemia the state of oral hygiene was unsatisfactory, however distinctly better than in the control group. Decidedly more plaque deposits were detected in the control group than in children with lymphoblastic leukemia. In the control group several children had dental plaque deposits visible to the naked eye, which was not observed in sick children with leukemia. Only 2 patients with leukemia had mild gingivitis, however, in the control group 3 children presented with moderate gingivitis and 2 had mild gingivitis. The differences in the values of OHI, Pl.I and GI were not statistically significant in this study (Table 5).

Table 5. Oral hygiene, dental plaque and state of gingiva in children with lymphatic leukemia and healthy controls

Index	OHI			Pl.I			GI		
	M	Chi^2	p	M	Chi^2	p	M	Chi^2	p
Children with leukemia	0.82	0.94	0.33	0.69	0.18	0.67	0.09	0.37	0.54
Healthy children	1.06			0.79			0.07		

M – arithmetic mean, p – statistically significant

DISCUSSION

In the group of children the examined values of dmf and DMF were high. No statistically significant differences in deciduous teeth were determined, which corresponds with the reports by other authors (5). In the permanent dentition DMFT was significantly higher, which is also confirmed by Fleming et al. They found significantly higher DMFT and considerably more extractions (M) in the group of children with remission of leukemia. The authors suggest that those children require a higher degree of specialist dental care (1). Also Pajari et al. found higher DMF among sick children, which was represented by increased decay during a year (3). High values of dmf and DMF were also observed by other researchers (2, 7). However, Tagliabue et al. did not

observe differences in DMF among the children suffering from leukemia in comparison to healthy controls (5). The majority of authors emphasize the need of intensive dental care with special attention to preventive measures and specialist dental treatment (4, 6).

CONCLUSIONS

1. High frequency of dental caries in permanent teeth was found in the group of children with lymphoblastic leukemia.
2. Dental caries in the deciduous teeth was less frequent in the group of children with lymphoblastic leukemia than in the control group.
3. The value of DMFT was higher in the study group than in the control group.
4. Oral hygiene was good in the group of children with lymphoblastic leukemia.
5. Index of dental plaque was low.
6. The majority of patients with lymphoblastic leukemia had their gums in satisfactory condition.

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SUMMARY

The purpose of the study was to evaluate the state of deciduous and permanent teeth, marginal periodontum and oral hygiene in children with acute lymphoblastic leukemia. Clinical examination covered 39 children suffering from acute lymphoblasic leukemia in 3–16-year-olds, starting treatment. The study also included a group of 39 healthy children who were the controls. Clinical examination evaluated the parameters of dental caries. The state of oral hygiene was evaluated by means of oral hygiene index (OHI) according to Green and Vermillion. The evaluation of periodontum included the plaque index (Pl.I) according to Silness and Löe and the gingival index (GI) according to Löe and Silness. Authors concluded that dental caries was highly frequent. The value of DMFT was higher in the study group than in the control group and the differences were statictically significant. Oral hygiene was satisfactory in the group of children with lymphoblastic leukemia.

Wybrane aspekty stomatologiczne u dzieci z białaczką limfoblastyczną

Celem pracy była ocena stanu uzębienia mlecznego i stałego, przyzębia brzeżnego oraz higieny jamy ustnej u dzieci z ostrą białaczką limfoblastyczną. Badaniem klinicznym objęto 39 dzieci w wieku od 3 do 16 lat z ostrą białaczką limfoblastyczną, rozpoczynających leczenie. Badaniem objęto również 39 dzieci ogólnie zdrowych. W wyniku badania klinicznego oceniono wskaźniki choroby próchnicowej, oceniono higienę jamy ustnej stosując wskaźnik OHI wg Greena Vermilliona, stan przyzębia oceniono wskaźnikiem płytki nazębnej Pl.I, natomiast stan dziąseł wskaźnikiem GI wg Löe i Silness. W wyniku przeprowadzonych badań stwierdzono wysoką frekwencję próchnicy zębów. Istotnie wyższy był poziom próchnicy w uzębieniu stałym wśród dzieci z białaczką limfoblastyczną. Stan higieny jamy ustnej oraz stan dziąseł był zadowalający.