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Socio-demographic Characteristics of Patients with Diagnosis of Leukemia in Bosnia and Herzegovina During Six-year Period

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ABSTRACT

Introduction: Malignancies in children are second most frequent cause of death after accidents in pediatric age, while leukemias represents 30% of all malignancies of children age. **Aim:** To present the social and demographic characteristics of patients with a diagnosis of leukemia in Bosnia and Herzegovina during six years period. **Patients and Methods:** The study included 97 patients (from birth to 18 years old) with diagnosis of acute leukemia. **Results:** During the aforementioned period at the Pediatric Clinic of University Clinical Centre Sarajevo, 244 patients with the diagnosis of malignancy were treated (99 children were with leukemia (40.6%). Acute leukemia's were diagnosed in 97 patients and chronic in 2 patients. Out of 97 treated patients with acute leukemia, they almost of all cantons of Federation of Bosnia and Herzegovina, Brcko District and the Republic Srpska. Patients were usually coming from the Tuzla Canton Federation of Bosnia and Herzegovina (28 patients). Based on the cytomorphological diagnosis of patients according to the FAB classification, the most was a present ALL-L1 type of acute leukemia's. Mortality of patients with ALL was 15,3%, while mortality of patient with AML was 36,8%. **Conclusion:** In Bosnia and Herzegovina, during six year period, the largest number of patients with leukaemia came from Tuzla Canton. The most common age of patients was preschool and school ages. Male sex was dominant in patients with diagnosis AML. According to the FAB classification, ALL-L1 type of acute leukemia was the most common.

Keywords: malignancy, leukemia, children.

1. INTRODUCTION

Malignancies in children are second most frequent cause of death after accidents in pediatric age. Those malignancies are leukemia, brain tumors, lymphoma and solid tumors (1, 2). Leukemias represents 30% of all malignancies of children age (3, 4). Leukemia is systematic malignancy of stem hematopoietic cells, which is characterized with clonal proliferation of myeloid and/or lymphoid immature cells (leukemic blasts). Due to enormous produce of leukemic blast cells, produce of normal blood cells is decreased together with compromised function of vital organs. If the diseased are not under treatment, death usually occurs within few months (4, 5). Higher incidence is at male sex (1,2 : 1), and incidence is 3-5 cases on 100 000 children. Etiology is uncertain and probably leukemia appears through interaction of genetic material and environmental factors (viruses, hereditary diseases, ionizing radiation, electromagnetic radiation, drugs, chemicals) with proved seasonal variation (peak of diseased is recorded during winter months and at the beginning of summer months), influence of geographical placement and increased risk at twins, chromosomal abnormalities, genetic diseases and at syndrome of immunodeficiency (4, 5, 6). In the last years increased risk of leukemia is connected with Humane T leukemic virus I (HTLV I) which induces transformation of cells or it is being integrated in host genetic material and activates cell genes which lead to malign transformation of cell (6). To 15th year of life, 97% leukemia are acute (AL), while 3% are chronic (CL) (2). In Europe and United States acute leukemia are in over 80% cases lymphatic (ALL), and in 15-20% cases myeloid leukemia (AML). Special form of leukemia at birth or in juvenile period is called congenital leukemia.

2. AIM

To present the social and demographic characteristics of patients with a diagnosis of leukemia in Bosnia and Herzegovina during six years period.

3. PATIENTS AND METHODS

The study included 97 patients (from birth to 18 years old) who were treated at the Department of Hematology, Pediatric Clinic, University Clinical Centre Sarajevo, Bosnia and Herzegovina. Patients were with diagnosis of acute leukemia. Research has a retrospective, descriptive and analytical character (January 2010 - May 2016). The survey was conducted in accordance with basic principles of the Helsinki Declaration (last revision in 2008).

4. RESULTS

As During the aforementioned period at the Pediatric Clinic, University Clinical Centre Sarajevo, 244 patients with the diagnosis of malignancy were treated (99 children were with leukemia (40.6%) (Table 1),

Total number of malignancy	244
Leukemia	99 (40,6%)
Lymphoma	33 (13,5%)
Tumors of the central nervous system	27 (11%)
Neuroblastoma	21 (8,6%)
Bone tumor	16 (6,5%)
Nephroblastoma	13 (5,3%)
Others	15 (6,2%)

Table 1. Distribution of malignancy in children

Acute leukemia's were diagnosed in 97 patients and chronic in 2 patients. Out 97 treated patients with acute leukemia, they almost of all cantons of Federation of Bosnia Herzegovina, Brcko District and the Republic Srpska. Patients were usually coming from the Tuzla Canton Federation of Bosnia and Herzegovina (28 patients) (Figure 1).

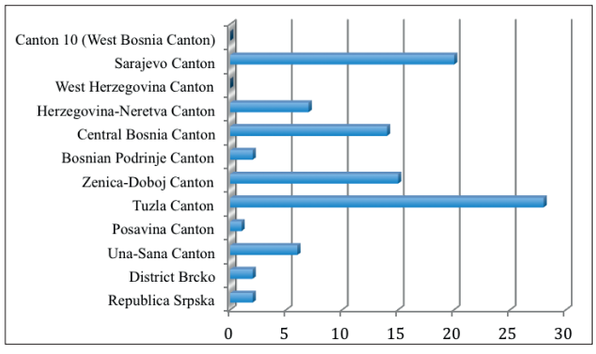

Figure 1. The distribution of patients according to the geographical territory

The age and gender distribution of acute leukemias is shown on Figure 2 and Figure 3.

Based on the cytomorphological diagnosis of patients according to the FAB classification, the most was a present ALL-L1 type of acute leukemias (Table 2).

Mortality of patients with ALL was 15.3%, while mortality of patient with AML was 36.8%.

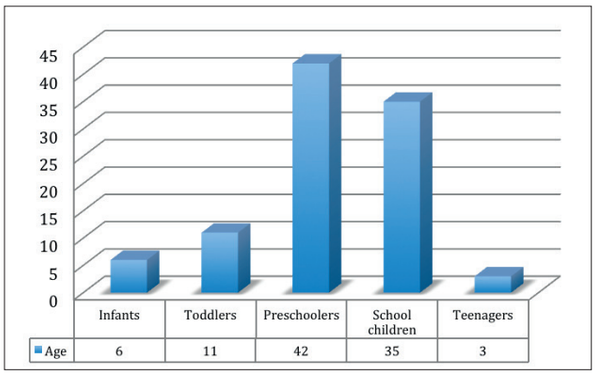

Figure 2. Age distribution of patients with acute leukemia

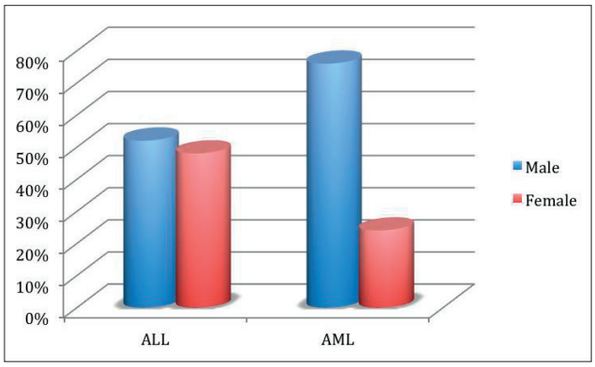

Figure 3. Gender distribution of patients with acute leukemia

Type of leukemia	Morphological type of leukemia	Number of patients	Percentage (%)
ALL	L1 type	54	55,67%
	L2 type	22	22,68%
	L3 type	2	2,06%
AMLFAB	MO - minimally differentiated	0	0%
	M1 - without maturation	1	1,03%
	M2 - with granulocytic maturation	7	7,22%
	M3 - acute promyelocytic leukemia	1	1,03%
	M4 - acute myelomonocytic leukemia	1	1,03%
	acute monoblastic leukemia (M5a) or acute monocytic leukemia (M5b)	6	6,19%
	M6 - acute erythroid leukemias	0	0%
	M7 - acute megakaryoblastic leukemia	2	2,06%
	Myeloid sarcoma	1	1,03%
CML		2	2,06%

Table 2. Distribution according to FAB classification

5. DISCUSSION

General opinion is that leukemia is one of the diseases that is most frightening for people, although in reality there are many diseases that are much more severe. There are many reasons for that fear. Some of them are complicated diagnostics, complex and unpredictable treatment, appearance of relapses, appearance of secondary malignancy, psychology of look, incomplete knowledge of disease (7). Malignancies are second most frequent cause of death in

developed countries of the world, and leukemia are most frequent malignancies in children (2, 8). In the last six and half years percentage of leukemia at our patients was over 40 % comparing to all malignancies (Table 1) (in literature it is about 30%), and number of 99 patients should be sufficient for realistic image of treatment and complications of treatment of acute leukemia. Out of 99 patients with leukemia, 97 of children had acute leukemia, and 2 children had chronic leukemia. Acute leukemia were lymphoid in 80,4% of cases, and myeloid in about 20% (19.5%) which is quite similar to the great epidemiological studies in the world. Data about difference in sex prevalence are also comparable to big studies in USA. In our study male sex was present in 62.85% cases, and in USA ratio between male and female sex is 1.2:1, with bigger domination of male sex at acute myeloid leukemia (78%). The highest incidence was at children in preschool age (42.3%). These data were expected and familiar in previous literature. The specific state organization in our country shows that this department in referral center of Pediatric Clinic, Clinical Center University of Sarajevo has a complete coverage of whole country space. Data are proportional mostly to the number of inhabitants of cantons. The data related to FAB classification shows that the highest percentage was ALL1 - 55.67% and ALL 2 22.68% or ALL L1 and ALL L2- 78.35% together of the complete number of leukemia. These results and development have influenced that five-year survival without signs of disease at out patients was over 80%, mortality at AL was 19.59% (19 patients died out of 97 treated), out of that number 12 had ALL L1 and L2 (15.38%), and 7 had AML (36.84%). In the world, percentage of survival is between 75-90%. Mortality rate related to infections is up to 10 times higher in poor countries comparing to rich countries (9). The way of treatment mainly depends from stratification of diseased in groups of standard, medium or high risk (age, number of leukocytes, sex, extramedullary localization of disease, immunophenotypic and cytogenetic characteristics of lymphoblast, early response on inducted therapy) .

Two the most important issues related to leukemia are unfortunately still etiology and treatment. They are probably based on molecular level. The etiology of leukemia is so far unclear. Increased risk of leukemia is associated with viruses, irradiation and chemical substances. The human T leukemic virus I (HTLV I) causes leukemia in humans (cell transformation is result of the specific integration of the virus into the host genome and in this case, the virus activates the cell genes that lead to cell transformation) (10, 11). Increase in incidence of leukemia is higher when it is join with many inherited and the acquired diseases. Hereditary basis of leukemia is not explained until today (12). Acquired diseases, especially diseases of hematopoietic stem cells can turn into acute leukaemia (therefore, chronic myeloproliferative disease and myelodysplastic syndrome are often called preleukemia. The latent preleukemic period before overt leukemia presents can take years, and the majority of carriers will never develop leukemia in their lifetime (preleukemic state is not rare, with greater than 1% of individuals having acquired one or more of the recognized preleukemic lesions) (13). Irradiation X-rays cause leukaemia in experimental conditions. After the explosion of the atomic bomb in Hiroshima and Nagasaki, the frequency of leukaemia was 30 times greater in the irradiated compared to non-irradiated population. AL is described also in patients that were treated with irradiation for in treatment of ankylosing spondylitis. The most frequent type of leukemia which can be seen after radiation of spine and joints is chronic myeloid and acute myeloid leukemia. Leukemia is described also at the persons that have been professionally exposed to low doses of X radiation. Most commonly those persons are radiologists. In the last few years with a better preventive measures prevalence of leukemia between radiologists is decreased. Leukemia can often be seen at persons that are in direct contact with benzene and its products, especially with toluene. Out of the drugs that can cause leukaemia chloramphenicol, phenylbutazone and sulfonamide are most frequently mentioned. Use of certain cytostatics is related to the higher prevalence of leukemia.

6. CONCLUSION

In Bosnia and Herzegovina, during six year period, the largest number of patients with leukemia came from Tuzla Canton. The most common age of patients was preschool and school ages. Male sex was dominant in patients with diagnosis AML. According to the FAB classification, ALL-L1 type of acute leukemia was the most common.

• The authors declare that no conflicting interests exist.

REFERENCES

1. Mardešić D. i sur. Pedijatrija, 8. dopunjeno izdanje. Školska knjiga, Zagreb, 2013; 198: 977-84.
2. Hasanbegović E. Maligne bolesti dječije dobi, Planjax. Tešanj, 2010. pp 8
3. Belson M, Kingsley B, Holmes A. Risk Factors for Acute Leukemia in Children: A Review. Environmental Health Perspectives. 2007; 115(1): 138-45. doi:10.1289/ehp.9023.
4. Linet MS, Ries LA, Smith MA, Tarone RE, Devesa SS. Cancer surveillance series: recent trends in childhood cancer incidence and mortality in the United States. J Natl Cancer Inst. 1999; 91: 1051-8.
5. Mičić D, Vujić D. Recidiv akutne limfoblastne leukemije kod dece. U: Đorđević M. Problemi u pedijatriji. Zavod za udžbenike, Beograd, 2016: 36: 201-18.
6. Petranović D, Pilčić G, Nacinovic Duletic A, Radaković M. Febrilna neutropenija. Medicina uminensis. 2011; 47(3): 281-6.
7. Merlen C, Bonnefoy A, Wagner E, Dedeken L, Leclerc JM, Laverdière C, et al. L-Asparaginase lowers plasma antithrombin and mannan-binding-lectin levels: Impact on thrombotic and infectious events in children with acute lymphoblastic leukemia. Pediatr Blood Cancer. 2015 Aug; 62(8): 1381-7.
8. Yeoh AE, Tan D, Li CK, Hori H, Tse E, Pui CH. Management of adult and paediatric acute lymphoblastic leukaemia in Asia: resource-stratified guidelines from the Asian Oncology Summit 2013. The lancet oncology. 2013; 14(12): e508-e523.
9. Hakim H, Flynn PM, Srivastava DK, Knapp KM, Li C, Okuma J. et al. Risk predic on in pediatric cancer pa

ents with fever and neutropenia. Pediatr Infect Dis J. 2010; 29: 53-9.
10. Castagnola E. The Role of Prophylaxis of Bacterial Infections in Children With Acute Leukemia/Non-Hodgkin Lymphoma. Pediatric Reports. 2014; 6(2): 5332.
11. De Naurois J, Novitzky-Basso I, Gill MJ, Marti Marti F, Cullen MH, Roila F and On behalf of the ESMO Guidelines Working Group. Management of febrile neutropenia: ESMO Clinical Practice Guidelines. Ann Oncol. 2010; 21 (suppl 5): v252-v256.
12. Mc Quay HJ, Moore RA. Issues involved in making choices in prophylaxis. Ann Intern Med 1997; 126: 712-20.
13. Shlush LI, Minden MD. Preleukemia: the normal side of cancer. Curr Opin Hematol. 2015 Mar; 22(2): 77-84. doi: 10.1097/MOH.0000000000000111.