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Epidemiologic Observations about Pediatric NHL in Albania

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Abstract: ***Background: The major part of NHL on children can be classified as one of the following types: lymphoblastic lymphomas, Small noncleaved cell lymphomas, large cell lymphomas. NLH is ranked in the third place after the leukemia and the brain tumors. The aim: To represent epidemiological data for NHL patients followed up during 1996-2010. Method: This study involved patients diagnosed with NHL. There was studied the annual average incidence and its dynamic, the distribution based on: stages, forms, gender, histology, age groups, geographic areas. Results: 93 patients (0-14 years old) with NHL have been enrolled in this study. Rate M/F is 1.7:1; the peak of incidence was in the age-group from 10-14 years; NHL represents 8.6% of all pediatric neoplasms and 15% of the solid tumors; The annual incidence of the general population is 0.19/10^5, annual average incidence is 0.57/10^5 children; the more prominent distribution is in the North part; the areas of Dibra and Durres have incidence that is increasing and the area of Shkodra has an incidence that is decreasing, the other areas have an irregular trend. The annual incidence is higher in urban areas. Conclusion: Our study offers epidemiologic, clinic data. We concluded that the distribution, according to age and gender, changes among NHL- subtypes. Our data have to get attention of the health institutions in order to create or compile strategies against cancer. Our study will, also, serve as a promoter in search of the favorable, explosive, environmental factors that might have influenced.***

Keywords: NHL, incidence, epidemiology, children

1. Introduction

Non –Hodgkin lymphoma (NHL) results from malignant proliferation of cells of lymphocytic lineage. The neoplastic pathology of pediatric age in Albania, in accordance with data of Ministry of Health and Institute of Statistic, includes 10% (5th place) of pediatric pathology. They ranked after pulmonary, neonate pathologies, congenital anomalies. The aim was to present epidemiological and demographic data for pediatric NHL in Albania, from 1996-2010. The main objectives are: a) to present the data about distribution of the cases with NHL in pediatric age group in our country according to geographical areas and the residence; b) to study the dynamics of NHL (in pediatric age) in a 15 year period; c) to identify the risk factors for NHL based on epidemiologic and demographic situation.

2. Materials and Methods

This study is prospective (the period following January, 2007) and retrospective (the period from January 1996 to December 2010), descriptive and exploratory, the data of all the cases that included in study, were analyzed in a descriptively manner, according to several variables (demographic, geographic related to place of residence, prognosis, etc).

The criteria of study's entry were: 1) The age in the moment of the diagnosis; 0-14 years old. 2) The diagnosis is confirmed with histopathology examination without using previous chemotherapy or radiotherapy and 3) residence in Albania.

- In our study are included 93 cases of the pediatric age (0-14 years old) with different types of NHL, diagnosed, treated and/or followed-up by the Pediatric Onco-hematology Service, Adult Oncology Service and Infant Surgery Service near UHC "Mother Theresa" in Tirana, Albania. The cases that are included in the study belong to a period 15 years (January 1996- December 2010).
- We have excluded from our study that all those cases which were associated with other pathologies, not related with the basic disease, can compromise or divert its progression, making not very reliable results of therapy.
- In the first year of the study, in order to maintain the authenticity of being national data, there were used some cases that were treated in Adult Oncology Service, since it was the year of the transfer of the pediatric oncology to pediatric department.
- We have noticed that our service is unique in our country, which means that every child with this pathology will be presented for diagnosis, treatment or follow-up, this fact makes us sure that our data have the right to be considered as a national study. This fact helped us to achieve the purpose of this study.
- The analyzed study's parameters were: a) the specific weight of pediatric NHL in our country in general pediatric morbidity, in neoplasms of the pediatric age. b) the annual average incidence/10^5 habitants of the general population andto the pediatric age in particularly and the dynamics of this incidence for the period which we were studying. c) the incidence based in the changes of the population and the different number of the births in years of the studying period. d) the geographical distribution of

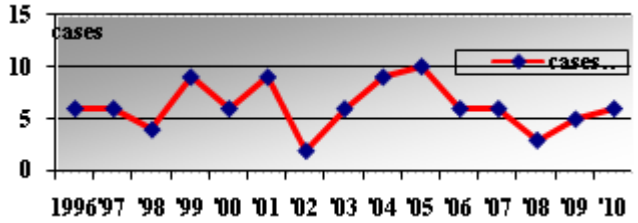
the NHL in the 12 regions of the country for the areas of the country, 36 districts in South, North and the center of Albania. e) the distribution of the NHL according to sex (for 10^5 children of every group sex) based on the M/F structure of the pediatric age in country. For these parameters were used demographic data from Statistical Department in the Ministry of Health and Demography Institute. The original row data initially were organized in excel database and in a later phase was imported to SPSS program in order to carry out the statistical analyses ("The Statistical Package for the Social Sciences" version 13.0- SPSS, Chicago, Illinois, USA). Correlation between continuous variables was tested through the student test, while for categorical variables it was applied the chi square test ($\chi 2$). The threshold value for determining the statistical tests of significances was fixed at p value ≤ 0.05, where $p \leq 0.05$ was considered statistically valid correlation and for values of $p > 0.05$ correlation is not statistically valid.

3. Results

During the period 1996-2010, 93 patients were reported to the Onco-hematology Service.

Table 1: Dynamic of NHL in 15 years (1996 – 2010) in pediatric ages

Year	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	Total
No. of new cases	6	6	4	9	6	9	2	6	9	10	6	6	3	5	6	93
Inc/10^5 baby birth live	0.55	0.55	0.37	0.83	0.55	0.83	0.18	0.55	0.83	0.92	0.55	0.55	0.28	0.46	0.55	0.57



Graph 1: Dynamic of NHL in 15 years (1996 – 2010) in pediatric ages

The table 1 and graph 1 show the number of new cases, diagnosed with NHL for every year of the study period.

The annual average incidence for period 1996-2010 is $0.57/10^5$ inhabitants or $5.7/10^6$ inhabitants.

Table 2: Dynamics of Incidence divided in 5-years

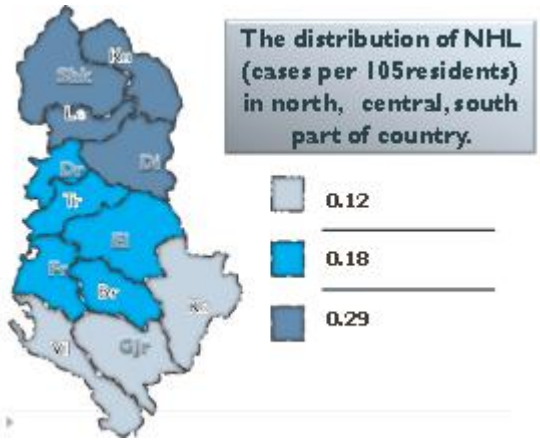
Period of time	No of case in 5 years	5 years Cumulative Incidence per 10^5 pediatric population	Annual Average Incidence per 10^5 pediatric population
'96 – '00	31	2.85	0.57
'01 – '05	36	3.30	0.67
'06 – '10	26	2.39	0.48
TOTAL '96 – '10	93	8.54	0.57

The dynamics of the incidence was divided into three periods (1996-2000); (2001-2005) and (2006-2010). The table 2 shows the number of cases and the risk of the developing NHL for every period of time, so the annual average incidence was higher in 2001-2005. We noticed that the incidence for 15 years period is calculated on the basis of the pediatric population (0-14 years).

Table 3: Distribution according to gender

Gender	Cases	% according to gender	Cl about gender distribution	Pediatric population	Inc./year 10^5 according to gender	RR (Cl)
Male	58	62%	52%-72%	565614	0.69	1.5 [0.5-5.2]
Female	35	38%	27% – 47%	522105	0.45	0.7 [0.5-5.2]
TOTAL	93	100		1 087 719	0.57	1

The tables 3 shows distribution according to gender for 15 years, it presents the prevalence in males that is significantly higher than in females (Confidence intervals, according to gender) do not overlap (RR. 1.5 vs. 0.7). Males predominate in a proportion of 1.7:1, 58 male (62%), 35 female (38%).



Graph 2: Symbolic geographic map distribution of incidence

The graph 2 shows that the annual incidence is higher in north part of country (2.9 cases per 10^6 residents).

Table 4: Distribution of new cases and annual average incidence according to districts

Districts	Population	Cases in 15 years)	Incidence/ 10^5 habitants/year
Berat	117,045	1	0.06
Bulqizë	28,399	0	0
Delvinë	11,983	0	0
Devoll	33,779	0	0
Dibër	62,814	5	0.53
Durrës	242,755	5	0.14
Elbasan	224,647	5	0.15
Fier	199,404	12	0.50
Gramsh	24,226	1	0.30
Gjirokastër	56,710	1	0.12
Has	17,416	0	0
Kavajë	82,906	1	0.08
Kolonjë	14,316	1	0.47
Korcë	138,873	5	0.24
Krujë	67,686	5	0.49
Kucovë	34,901	2	0.38
Kukës	45,616	2	0.29
Kurbin	54,967	2	0.24
Lezhë	77,170	1	0.09
Librazhd	63,181	5	0.53
Lushnje	143,250	4	0.19
M. Madhe	36,085	3	0.55
Mallakastër	31,350	1	0.21
Mat	48,794	3	0.41
Mirditë	26,663	0	0
Peqin	30,999	0	0
Përmet	22,025	2	0.60
Pogradec	70,562	0	0
Pukë	24,319	2	0.55
Saranda	48,465	0	0
Skrapar	18,869	0	0
Shkodër	185,612	8	0.29
Tepelenë	23,796	1	0.28
Tiranë	717,291	13	0.12
Tropojë	16,257	1	0.41
Vlorë	151,286	1	0.04
TOTAL	**3,194,417**	**93**	**0.19**

The table 4 shows distribution of cases diagnosed during 15 years, for each district.

Table 5. Distribution of cases and annual average incidence according to Region

No	REGION	Population	Cases(15 years)	Inc./10^5 habitants/year
1.	BERAT	170,815	3	0.12
2.	DIBËR	140,007	8	0.38
3.	DURRËS	310,441	10	0.21
4.	ELBASAN	343,053	11	0.21
5.	FIER	374,004	17	0.30
6.	GJIROKASTËR	102,531	4	0.26
7.	KORÇË	257,530	6	0.16
8.	KUKËS	79,289	3	0.25
9.	LEZHË	158,800	3	0.13
10.	SHKODËR	246,016	13	0.35
11.	TIRANË	800,197	14	0.12
12.	VLORË	211,734	1	0.03
	TOTAL	3,194,417	93	0.19

The table 5 shows geographic distribution of cases according 12 regions. These data helped us to identify the region with higher incidence rate compared with the national average annual incidence.

4. Discussion

Ranking of NHL in pediatric neoplasm referrals is similar to some other international studies. According to the data of ACCIS and EUROCARE, International Classification of the children's cancer has ranked: leukemia 34%; Brain tumors 23%; Lymphoma 12% [2, 7].

The annual average incidence in our study results 5.7 case/10^6 inhabitant of the pediatric population (1 087 719) and 1.9/10^6 inhabitants (3 194 417). The annual incidence referred by some authors approximates to our data while they differ in some other cases; from 50-100/10^6 in Africa [1], 10/10^6 in USA [3], 8.9/10^6 in France [5], 9.4/10^6 in a 10 year European Study [4].

The dynamics of the incidence was divided into three periods: (1996-2000); (2001-2005) and (2006-2010). Our study shows number of cases and risk of developing NHL for every period of time, so the annual average incidence was higher during the years 2001-2005. We noticed that the incidence for the period of 15 years is calculated on the basis of the pediatric population (0-14 years).

Related to sex, males predominated in a proportion of 1.7:1, 58 male (62%), 35 female (38%). The other authors have referred the same figures: 2:1 (Turkey) [6]; 2.4:1 (Brasil) [8]; 2.5:1 (America [3], India [9]); 2.6:1 (Hungary) [10].

In this study our data are interesting. There are seen districts in which the incidence for consecutive years remains zero (e.gBulqiza, Delvina, Devolli, Hasi, Mirdita, Peqini, Pogradeci, Saranda, Skrapari), meanwhile there are some other regions which have a high incidence, being also the main "suppliers" of the general incidence of the country (e.gPermet, Puke, Malesi e Madhe, Diber, Fier etc.).

The incidence, by geographic area, appears higher in the northern area of the country and with a downward trend, from the central area to the south area, where the incidence appears lower.

These results can be related to the fact that these regions are industrial or mineral extraction areas or may have other causes, known or undetected and referred before.

We reviewed the medical records of 93 patients admitted with diagnosis of NHL to the Pediatric Oncology Unit at the IMIP during the period from January 1996 to December 2010.

5. Conclusion

NHL is ranked in the third place (8.6%), between the most neoplastic pathologies, NHL is ranked in the second place (15%), between the solid tumors in our study.

Our results gave a national annual average incidence around $2/10^6$ inhabitants of the population, the annual average incidence of NHL was $6/10^6$ inhabitants of the pediatric population.

The dynamic study in three periods demonstrates interesting data, the annual average incidence was statistically higher during the years 2001-2005 and it can be incentive for more researches of favorable, explosive, environmental or other types of factors that may have an influence on this phenomenon.

Our data have to get the attention of the Health Institutions in order to create or compile strategies against cancer. Our study will, also, serve as a promotor in search of the favorable, explosive, environmental factors that might have influenced.

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Author Profile

Xhafa Mirela received the M.S. degree in Pediatric-Onco Hematology in University of Tirana, Faculty of Medicine from 1987 to 1992. In the period of 1994-1998 she got specialized for General Pediatry. During all these years she has participated actively in several short-long run specializations, conferences, congresses, inside and outside Albania. From 1998 and on, she works as a Pediatrician Onco-Hematologist in the UHC "Mother Theresa".Since 2013 she is MD, PhD.