



OVERVIEW OF CHILDHOOD MALIGNANCY IN DIYALA PROVINCE / IRAQ

Mohammad Abdul Qader Alchalabi¹, Husameldeen Hameed Shalal² and Najdat Shukur Mahmood^{3*}

^{1,2}Pediatrician, Al- Batool Teaching Hospital for Children and Maternity, Diyala, Iraq.

³Assis. Prof., Pediatrician, College of Medicine/ Diyala University, Diyala, Iraq.

***Corresponding Author: Dr. Najdat Shukur Mahmood**

Assis. Prof., Pediatrician, College of Medicine/ Diyala University, Diyala, Iraq.

Article Received on 03/12/2017

Article Revised on 24/12/2017

Article Accepted on 14/01/2018

ABSTRACT

Cancer is generally an uncommon disorder in childhood worldwide; however, it is a major public health problem. Identification of prevalence and its demographic, etiological, prognostic markers will lead to major advances in treatment and survival. This is a descriptive, retrospective study at oncology unit in Al-Batool teaching hospital. A total of 133 patients were enrolled in the study, acute lymphoblastic leukemia was the commonest tumor (n=56, 42.1%), followed by lymphoma and neuroblastoma. Other malignancies were variably distributed. They were significantly associated with many characters including male gender (.00) and young age, urban areas residency, O⁺ blood group, consanguinity marriage (p value=.000 for each), whereas congenital anomalies and family history of malignancy were detected in minority of patients. In Conclusion, the general pattern of distribution and epidemiological and personal characters of pediatric tumors in this study resemble that reported from other various states. Childhood malignancies were significantly associated with many sample criteria like 1-10 year old, male gender, urban areas, O⁺ blood group, and consanguinity marriage.

KEYWORDS: cancer, leukemia, children.

INTRODUCTION

Childhood cancer is the cancer which develop in children aged 0- 14 yrs and sometimes it extended to include adolescent of 15-19 yrs old.^[1,2] Worldwide, it is estimated that childhood cancer has an incidence of more than 175,000 per year and that around 96,000 of these children do not survive.^[3] Although it rare, accounting less than 1 % in developed countries, it is a major public health problem worldwide and is the second leading cause of death in the United States following accidents. Major advances in treatment led to decrease of mortality rate over the last two decade, but still it is the most common cause of death due to illness in certain states with racial dissimilarity.^[1,2,4] In developed countries, childhood cancer has a mortality of approximately 20% of cases.^[5]

The most common childhood malignancies are leukemia (32%), brain (18%), lymphoma (11%).^[6,7] Incidence patterns in the pediatric age group show two peaks, the first in early childhood and the second in adolescence. During the 1st year of life, embryonal tumors such as neuroblastoma, nephroblastoma (Wilms tumor), retinoblastoma, rhabdomyosarcoma, hepatoblastoma, and medulloblastoma are most common. These tumors are much less common in older Children. Embryonal tumors, acute leukemias, non-Hodgkin lymphomas and gliomas peak at 2-5 year of age 2-5 year of age. As

children age; bone malignancies, Hodgkin disease, gonadal germ cell malignancies(testicular and ovarian carcinomas), and other carcinomas increase in incidence. Incidence rates also vary by gender (generally higher in boys vs girls), race/ethnicity (more common in whites), and between countries.^[8]

Childhood cancers are quite different from that of adults in many aspects, it is less likely related to lifestyle, like smoking, unhealthy diet, alcohol consumption, and environmental risk factors than adults cancers, in < 5-10% of cases, there are known environmental exposures and exogenous factors, such as prenatal exposure to tobacco, X-rays, or certain medications. Familial and genetic factors are identified in 5-15% of childhood cancer cases and are usually presented early in life even intrauterine, for the remaining 85-90% of cases, however, the individual causes remain unknown. In most cases, as in carcinogenesis in general, the cancers are assumed to involve multiple risk factors and variables.^[9,10]

This study aimed to show the distribution of malignancies among population of Diyala province/ eastern Iraq and their demographic and personal criteria.

PATIENTS AND METHODS

The study is a descriptive, non-interventional, retrospective, single-hospital based study, conducted at Oncology Unit in Al-Batool Teaching Hospital for Maternity and Children in Diyala province, Iraq which was established at 2012. It was carried out at Jan 2017 to Jul 2017. All cancer diagnosed children of less than 15 years old registered and treated in the unit were enrolled in the study; a self-prepared questionnaire was used to record patients' data from their files.

Type of cancer, the age at initial presentation, gender, blood group, the living pattern whether rural or urban area were gathered and analyzed. Relationship of type of cancer with other several factors, including family history of malignancy, consanguinity marriage, and congenital anomalies, were investigated.

Statistical package of social sciences (SPSS), version 20, was used for statistical analysis to calculate the frequencies; Chi square test was applied to find the association between variables, p value was set at level of (0.05).

RESULTS

A total of 133 patients were enrolled in the study, 60.15% of them were male with a male: female ratio of 1.5:1, this disparity was more apparent in Non-Hodgkin's lymphoma (p value=.00). Acute lymphoblastic leukemia (ALL) was the commonest tumor (n=56, 42.1%), lymphoma was the second (n= 24, 18%), including both Hodgkin and non Hodgkin lymphoma (NHL), and neuroblastoma was the third (n=13, 9.8%). Other malignancies were variably distributed. Young age group was the commonest affected age group, followed by older children, this make the age (>1-10) year as the most age group (n=107, 80.5%), table 1 and 2. Embryonal tumors like neuroblastoma, wilm's tumor, rhabdomyosarcoma, and retinoblastoma were strikingly more in young children,

except hepatoblastoma and neuroectodermal tumor which were the least likely witnessed.

The majority of the patients were lived in Baquba (city center of Diyala) indicating that urban areas residency dominated among enrolled children. Blood group (O⁺) was the highest prevalent blood group among, followed by blood group A⁺. Consanguinity marriage was reported in most affected children, but family history of malignancy was low and congenital anomalies was detected in minority of patients, table (3-5).

Table 1: Prevalence of childhood cancer among study group.

Type	Patients number (%)
Acute lymphoblastic leukemia	56 (42.1)
Non-Hodgkin's lymphoma	16 (12)
Hodgkin lymphoma	8 (6)
Neuroblastoma	13 (9.8)
Nephroblastoma (Wilms tumor)	8 (6)
Brain tumors	6 (4.5)
Acute myeloid leukemia	6 (4.5)
Rhabdomyosarcoma	5 (3.8)
Retinoblastoma	4 (3)
Histiocytosis	4 (3)
Ewing sarcoma	3 (2.3)
Chronic myeloid leukemia	1 (0.8)
Hepatoblastoma	1 (0.8)
Osteosarcoma	1 (0.8)
Neuroectodermal tumor	1 (0.8)
Total	133 (100)

Table 2: Distribution of the type of malignancy to gender and age at initial presentation.

Type of malignancy	Gender	Age (yr)				Total
		0 -1	>1 - 4	>4-10	>10- 15	
Acute lymphoblastic leukemia	M	-	14	13	6	33
	F	2	8	11	2	23
Non-Hodgkin's lymphoma	M	-	5	7	-	12 *
	F	-	2	1	1	4
Hodgkin lymphoma	M	-	2	2	2	6
	F	-	-	2	-	2
Brain tumors	M	-	-	-	-	-
	F	-	-	4	2	6
Acute myeloid leukemia	M	-	2	-	1	3
	F	-	3	-	-	3
Nephroblastoma (Wilms tumor)	M	1	2	2	-	5
	F	-	2	-	1	3
Rhabdomyosarcoma	M	-	3	-	-	3
	F	-	1	-	1	2

Neuroblastoma	M	2	7	-	-	9
	F	-	1	3	-	4
Histiocytosis	M	-	2	-	-	2
	F	-	2	-	-	2
Ewing sarcoma	M	-	-	-	1	1
	F	-	-	2	-	2
Retinoblastoma	M	1	1	-	-	2
	F	1	1	-	-	2
Chronic myeloid leukemia	M	-	-	-	1	1
	F	-	-	-	-	-
Hepatoblastoma	M	-	-	1	-	1
	F	-	-	-	-	-
Osteosarcoma	M	-	-	-	1	1
	F	-	-	-	-	-
Neuroectodermal tumor	M	-	-	1	-	1
	F	-	-	-	-	-
Total	M	4	38	26	12	80(60.2)*
	F	3	20	23	7	53(39.8)
Total Number (%)		7 (5.26)	58 (43.6)**	49 (36.8)	19 (14.3)	133 (100)

* p value= significant.

** p value= highly significant.

Table 3: Geographic distribution of the study group.

Residency	Patients number (%)
Baaquba	49 (36.8)**
Khalis	22 (16.5)
Muqdadia	20 (15)
Baladrooz	11 (8.3)
Kanaan	9 (6.8)
Al- Mansoriya	12 (9)
Bani- Saad	5 (3.8)
Khanageen	5 (3.8)

** p value= .000

Table 4: Distribution of study group to the ABO/ Rh blood groups.

Blood group ABO ^{Rh}	Patients number (%)
A ⁺	36 (27.1)
B ⁺	29 (21.8)
B ⁻	3 (2.3)
O ⁺	55 (41.4)**
O ⁻	3 (2.3)
AB ⁺	7 (5.3)

** p value = .000

Table 5: Relationship of type of cancer with certain criteria of the study patients.

Type of cancer	Factors	Consanguinity marriage No. (%)	Family history of cancer No. (%)	Congenital Anomaly No. (%)	Residency No. (%)
	Positive Negative				Urban Rural
Acute lymphoblastic leukemia	P	32 (57)	9 (16)	0	37 (66)*
	N	24 (43)	47(84) **	56	19 (34)
Non-Hodgkin's lymphoma	P	7 (44)	2 (14)	0	15 (94) **
	N	9 (56)	14 (86)*	16	1 (6)
Hodgkin lymphoma	P	7 (87)*	1 (13)	0	7 (87)*
	N	1 (13)	7 (87) *	8	1 (13)
Brain tumors	P	6	0	0	2 (33)
	N	0	6	6	4 (67)
Acute myeloid leukemia	P	5 (83)	2 (33)	0	3 (50)
	N	1 (17)	4 (67)	6	3 (50)
Nephroblastoma (Wilms tumor)	P	7 (87)*	3 (38)	1 (13)	5 (62)
	N	1 (13)	5 (62)	7 (87) *	3 (38)
Rhabdomyosarcoma	P	5	1 (20)	0	4 (80)
	N	0	4 (80)	5	1 (20)
Neuroblastoma	P	7 (54)	3 (24)	2 (15)	10 (76)
	N	6 (46)	10 (76)	11 (85)*	3 (24)

Histiocytosis	P	2 (50)	1 (25)	1 (25)	2 (50)
	N	2 (50)	3 (75)	3 (75)	2 (50)
Ewing sarcoma	P	3	0	0	2 (67)
	N	0	3	3	1 (33)
Retinoblastoma	P	1 (25)	2 (50)	0	4
	N	3 (75)	2 (50)	4	0
Chronic myeloid leukemia	P	1	0	0	0
	N	0	1	1	1
Hepatoblastoma	P	1	0	0	0
	N	0	1	1	1
Osteosarcoma	P	1	0	0	1
	N	0	1	1	0
Neuroectodermal tumor	P	1	0	0	0
	N	0	1	1	1
Total	P	86 (65)*	24 (18)	4 (3)	92 (69)**
	N	47 (35)	109 (82)**	129 (97)**	41 (31)

* p value: significant.

** p value: highly significant.

DISCUSSION

Data on malignant tumor incidence are scanty in developing countries and this is the first epidemiological study that provides an overview on childhood cancer in Diyala province.^[11] The general pattern of pediatric tumors in this study seems to resemble the distribution of pediatric cancers reported from other countries, a part from brain tumor, which is the third most common cancer in most of studies, only six cases of brain tumors were registered in the current study because the patients of brain tumor received medical care from nearby neurosurgery specialized hospitals and they did not attend the study center. The ALL was the commonest type of cancer, followed by lymphoma of both types (Hodgkin and non-Hodgkin), embryonal tumors were the third malignancies, other malignancies were (in descending order) Neuroblastoma, Wilm's tumor, Rhabdomyosarcoma, Retinoblastoma, Hepatoblastoma, and Neuroectodermal tumor. These were similar to results of other literatures.^[12-16]

Age distribution of different cancers was variable. ALL, NHL, and Hodgkin disease were predominant in age group (>1-10) year and this was going with many other studies.^[12-15,17] The frequency of embryonal tumors were strikingly more in young children, this also reported in other sources, except hepatoblastoma and neuroectodermal tumor which were the least likely detected as noted in the current study.^[8,18] Early onset of such tumors suggests a prenatal/congenital origin of embryonal tumors as suggested by others.^[19]

Overall, male gender was significantly more affected by childhood cancer than female with M:F ratio 1.5:1 which is similar to other studies and this is more apparent in NHL.^[12-15,17,20] This gender disparity possibly due to the genetic differences in the immune function between male and female.

Most of the registered patients from urban areas mainly from Baquba city (center of the province) in most of types of malignancies; this was inconsistent with other studies.^[14,15,20,21] This might be due to displacement of the people from rural to urban areas due to Islamic state of Iraq and Syria (ISIS) occupation to most of the rural areas. Anyhow, these percentages must be adjusted to the number of population of regions.

The blood group O^{+ve} was the most prevalent followed by group A^{+ve} and B^{+ve}, a case – control study must be done accounting the distribution of blood group in the general population of the study because blood group O^{+ve} was already the most common group in Iraqi people.^[22,23] However, proving this finding may raise the possibility of using blood group as an epidemiological marker for identifying population subgroups which are at high risk for childhood malignancies.

Consanguinity marriage was significantly associated with cancer in sample of the study and family history of cancer was reported in about one fifth of enrolled patients and it reached to 50 % in retinoblastoma cases, although it approach to zero in others. These findings might refer to genetic susceptibility of childhood malignancy; these were supported by other studies.^[24-26]

Congenital anomalies were detected in (3%) of the study group which was not compatible with other studies. This may be due to relatively small sample size of the study to search for such uncommon disorder in infrequent disease of cancer and congenital anomalies which need large population, notably, these small percent was detected among children with solid tumor (wilms tumor, neuroblastoma, and histiocytosis) than among those with leukemia and lymphoma in spite of number discrepancy, this was consistent with previous studies.^[27,28]

CONCLUSIONS

The general pattern of pediatric tumors in this study seems to resemble the distribution of pediatric cancers reported from other studies: ALL was the most common tumor. Childhood malignancies were significantly associated with many sample criteria like 1-10 year old, male gender, urban areas, O⁺ blood group, and consanguinity marriage.

Recommendations

Further multi- center study at level of the country is required to describe each type of malignancy separately regarding epidemiological and etiological criteria, in addition to show their prognostic factors and outcomes.

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