RESEARCH ARTICLE

Characteristics of Hodgkin Lymphoma in a Defined Group of Iranian Pediatric Patients

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Abstract

This study was conducted to describe the characteristics of Hodgkin lymphoma in Iranian children. In a referral center for pediatric oncology (Mofid Hospital) in Tehran, patient data over a 10-year period were retrieved and recorded accordingly. Among 82 cases, 73.2% were male, 26.8% were female, and 70.7% were 5-9 years old. About 40% of patients were in stage III and 42.7% had systemic signs. Cervical nodes were commonly involved (91.5%). The most frequent histological subtype was mixed cellularity. The main hematological features were anemia (47.6%), lymphopenia (20.7%), and eosinophilia (8.7%). Survival rate was 72%, and 8.4% of patients were deceased. A 3% recurrence rate was observed in our patients. A significant relationship was found between the stage of disease and systemic signs ($P<0.0005, \chi^2$). Despite diagnosis of Hodgkin lymphoma in many children in Iran being made in higher stages, the mortality rate is relatively low.

Keywords: Hodgkin lymphoma - pediatric - Iran

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Introduction

Lymphomas account for about 10-15% of all malignancies in children (Birch et al., 2003; Gualco et al., 2010; Riad et al., 2010) representing 2-3% of all malignancies with a peak incidence between 5-9 years (Riad et al., 2010) of which about 4-7% are Hodgkin lymphomas (HL) and 7-10% are non-Hodgkin lymphomas (NHL) (Clarke and Glaser, 2002; Birch et al., 2003; Burkhardt et al., 2005; Gadelkarim Ahmed et al., 2013; Ward et al., 2014)

Hodgkin lymphoma represents approximately one-third of lymphomas in pediatrics and is divided into classical Hodgkin lymphoma (CHL) and nodular lymphocyte predominant (NLP) category (Jaglowski et al, 2005; Belgaumi et al., 2008; Gualco et al., 2010). In general, CHL constitutes about 1% of all cancers and 30% of the lymphoid malignancies (Huang et al., 2011). In the pediatric population, most of the affected cases are CHL (Dinand and Arya, 2007).

The incidence of HL in childhood varies by age such that HL is exceedingly rare in infants, but is the most common childhood cancer in the 15- to 19-year-old age group (Smith et al., 2010). According to Thomas et al and de Camargo et al in developing and under developed countries, the first peak of HL occurs usually in infancy and its incidence seems to decline with age (Thomas et al., 2002; de Camargo et al, 2010).

During past three decades, the incidence trend seems increase in boys but decrease in girls with the estimated annual change was 1.8% per year increase in boys and 2.6% per year decrease in girls (Srina et al., 2010).

The etiology is unknown. The possible risk factors are genetics, socioeconomic status, viral infection especially HIV and Epstein Barr virus, radiation, organic substances, and breast feedig (Srina et al., 2010 ; Sang et al., 2012; Wang et al., 2013; Linabery et al., 2014).

In Iran, as a developing country, few comprehensive clinicopathological and epidemiological studies were done on pediatric lymphomas. Therefore, the aim of this study was to determine the epidemiologic features of Hodgkin lymphoma in a defined goroup of children living in Tehran, Iran.

Materials and Methods

Medical records of children with CHL diagnosed at Department of Oncology, Mofid Pediatric Hospital,Tehran, Iran were studied over a period of ten years. Finally 82 case history of patients whose final diagnosis was Hodgkin lymphoma were assessed in terms of gender, age at the time of diagnosis, staging of disease, location of involvement, absence or presence of systemic signs, hematological profile, histological subgroups (mixed cellularity (MC), nodular sclerosing (NS), lymphocyte predominant (LP), and lymphocyte depletion (LD), treatment planning and survival rate.

Data were recorded and described using SPSS soft ware (version 18) and chi- square Test. P-value less than 0.05 was considered significant.

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Table 1. Distribution of Age, Sex, Location of Lymphadenopathy, Hematologic Features and Histological Subtypes in Study Group According to the Stages of Disease

Stage (%)	Age			Sex		Location of Lymphadenopathy					Hematologic Features			Histological Subgroups			
	0-4 (years)	5-9 (years)	10-14 (years)	M	F	Cer	Ax	Med	Sup	Ing	Int	A	Lym	Eos	LP	NS	MC	LD
I (15.9%)	1.90%	9.40%	4.50%	11.50%	4.40%	14%	3.70%	1%	1.70%	0	0	6.50%	2.10%	0	6.50%	4%	5.40%	0
II (36.6%)	3.70%	25.10%	7.80%	25%	11.60%	35.50%	7%	12.10%	4.80%	0	0	17.60%	3.70%	1.20%	7.80%	17.40%	11.40%	0
III (39.0%)	5.20%	31.30%	2.50%	30.20%	8.80%	36%	14.30%	16.40%	2%	6.30%	18.90%	16%	6.90%	3.10%	3.10%	9.80%	25.50%	0.60%
IV (8.5%)	1.40%	4.90%	2.20%	6.50%	2%	6%	1.80%	7.40%	0	3.40%	7.90%	7.50%	8%	4.20%	0.90%	1.70%	2.80%	3.10%
Total	12.20%	70.70%	17.10%	73.20%	26.80%	91.50%	26.80%	37.80%	8.50%	9.70%	26.80%	47.60%	20.70%	8.50%	18.30%	32.90%	45.10%	3.70%

*M, male; F, female; Cer, cervical nodes; AX, auxiliary nodes; Med, mediastinal nodes; Sup ,Supraclavicular nodes; Ing, inguinal nodes; Int, intraabdominal nodes; A, anemia; Lym, Lymphopenia; Eos, eosinophilia; LP, Lymphocyte predominant; NS, nodular sclerosing; MC, mixed cellularity; LD, Lymphocyte depletion

Results

Among 82 cases of CHL (≤14 years old) over a ten-year period, 73.2% were male and 26.8% were female, with ages ranging from 3 to 14 years. However, most of the patients (70.7%) were between 5 and 9 years old. About 40% of patients were in stage III, followed by stage II, stage I, and stage IV. In our cases, 42.7% had systemic signs (such as fever, night sweats and/or unexplained loss of body weight). There was a significant relationship between the stage of disease and presence of systemic signs according to chi-square test ($p<0.0005$).

The most frequent histological subtype was mixed cellularity (MC), followed by NC, LP, and LD. The most common site of involvement was cervical nodes (91.5%). Splenomegaly and involvement of the Waldeyer's ring were also seen in 39% and 4.8% of cases, respectively. The main hematological features in our patients were: anemia (47.6%), lymphopenia (20.7%), and eosinophilia (8.7%). Chemotherapy, radiotherapy and combination therapy were performed in 39%, 18.3% and 37.8%, orderly. 4.9% of patients did not receive any treatment. Generally, in this study, survival rate was 72% and 8.4% of patients deceased. No record for survival rate in 16 cases was found. A 3% recurrence rate was observed in our patients. Finally, the main characteristics of our patients are summarized in Table 1.

Discussion

In this study, the number of male subjects (60, 73.2%) was higher than females (22, 26.8%). This finding is in agreement with some previous studies (Gualco et al., 2010; Dinesh et al., 2011; Huang et al., 2011).

Most of our patients (70.7%) had between 5 and 9 years old at the time of diagnosis and 86.6% of all cases were 10 years old or younger similar to other reports (Parkin et al., 2005; Gualco et al., 2010; Riad et al, 2010). Parkin et al. demonstrated that in Turkey, children younger than 14 years old had a higher incidence of Hodgkin and non-Hodgkin disease compared to German children (Parkin et al., 2005). Also, Gualco et al showed that 66% of all pediatric/adolescent lymphoma patients were 14 years old or younger (Gualco et al., 2010). It is noted that in developed countries, the onset of HL has a bimodal age distribution with two peaks near 25 and 60 years old (Mac Mahon, 1957; Glaser and Hsu, 2003). In underdeveloped or developing countries the first peak of HL occurs usually in infancy and decreases with age (Thomas et al., 2002; de Camargo et al, 2010). In Oriental populations the first incidence peak represents predominantly in childhood with a second peak in the elderly, although in Japanese CHL patients the first incidence peak was reported to be absent (Mac Mahon, 1957; Glaser and Hsu, 2003). Furthermore, Lee showed a single age peak at the 3rd decade for CHL patients in Taiwan (Lee et al., 2005).

According to our results, 42.7% of patients had systemic signs. In agreement with our finding, Bazzeh et al reported systemic signs in 39% of children/adolescents and 48% of adults (Bazzeh et al., 2010). In the present study, the most frequent histological subtype was mixed cellularity (MC). This finding is in accordance to other studies (Araujo et al., 2006; Huang et al., 2011). In general, it is demonstrated that the MC is the most prevalent subtype of HL in underdeveloped countries (Sandoval et al., 2002; Schwartz, 2005). In contrast to our results, Vassallo et al. found a 70% incidence of the NS subtype in adults and children patients (Vassallo et al., 2005). In addition, Bazzeh et al. showed that the nodular sclerosis (NS) subtype was significantly more common in pediatric age group (Bazzeh et al., 2010). Chabay et al. reported the same findings also (Chabay et al., 2008).

In our study, the most common site of involvement was cervical nodes, followed by mediastinal, axillary, intra-abdominal, inguinal, and supraclavicular lymphadenopathy. These findings are close to some previous reports. On the basis of these researches, the most common sites of initial presentation of Hodgkin lymphoma were cervical and supraclavicular nodes. However, the disease initially appeared in less than 5% of the cases in the inguinal and abdominal nodes (Bociek and Armitage, 1999; Harris, 1999a; 1999b; Jaffe, 1999).

In the present study, involvement of inguinal and intraabdominal nodes was not found in the stages I and II of the disease.

The main hematological change in our patients was anemia. It is noteworthy that eosinophilia was not found in stage I.

Generally, survival rate in our cases was 72%. This rate was reported 96% and 88% for children/adolescent and adult patients in Bazzeh' study, respectively (Bazzeh et al., 2010).

In conclusion, this study provides important epidemiologic data about pediatric Hodgkin lymphoma patients, which may help health care providers, plan preventive or early diagnostic protocols in Iran. Despite the diagnosis of Hodgkin lymphoma was made in higher stages in many children patients, the mortality rate was relatively low.

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