Acute Leukemias of Childhood: A Retrospective Analysis of 62 Cases

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Abstract

Acute leukemia is reported to be less common in developing countries compared to non-Hodgkins lymphomas which is the most common childhood malignancy.) A retrospective analysis was performed to identify the clinicopathological features of acute leukemias of childhood at the Oncology Department of Allama Iqbal Medical College, Lahore. The commonest malignancy in the under 15 years age group was leukemias (54%) followed by non-Hodgkins lymphomas (16%). Acute lymphocytic leukemia (ALL) was the commonest subtype (82%) followed by acute myeloid leukemia (16%). Peak incidence occurred in the 2.5-5 years age. The median duration of symptoms prior to diagnosis was 5 months. We conclude from our study that the incidence and clinicopathologic paediatric ALL is similar to that reported in the Western literature, unlike reports from other developing countries. Various environmental, viral and dietary carcinogens may play a major role in the etiology of leukemias (JPMA 46: 147,1996).

Introduction

Acute leukemias are the most common malignancies of childhood. Approximately 2000 new cases are diagnosed in the United States annually accounting for one-third of all the cases of childhood cancers[1] of these, over 80% are classified as Acute Lymphoblastic Leukemias (ALL), approximately 17% as Acute Myeloid Leukemias (AML) and the remainder as cases of Chronic Myeloid Leukemias (CML) [2]. There appears to be geographical differences in the frequency and age distribution of acute lymphoblastic leukemias. In North Africa and the Middle East, acute lymphoblastic leukemia is relatively rare. In India and China, ALL is somewhat more common, but its incidence is considerably less than in the industrialized West[3]. This geographical variation may reflect different immunological subtypes of ALL[4].

Environmental factors with possible association with leukemias include exposure to herbicides, pesticides, parental occupational exposure to chemicals, solvents and chemical contamination of ground water[4-6]. Recently interest has turned towards the role of viruses and electromagnetic radiation fields as causative factors although the issue is not settled.

Due to lack of national tumour registries in Pakistan, it is difficult to speculate as to the most common malignancy of childhood. The data available is from single institution studies. This study is a retrospective data collection of 62 cases of childhood leukemias over atwo year period. it analyses the epidemiological factors and clinicopathological features of acute leukemias of childhood. Various environmental factors which possibly could account for the relatively high figures of acute leukemias in the study have also been highlighted.

Patients and Methods

Sixty-two leukemia patients of age upto 15 years seen from July, 1992 to June, 1994, in the Oncology Department of Alla.ma Iqbal Medical College, Lahore were analysed. A form for collecting data on

epidemiology of childhood leukemias was filled by questioning the patients, ortheirparents usually on their 2nd or 3rd visit to the physician. In some cases, data was obtained retrospectively from the patient's file, Only those patients with bone marrow proven diagnosis of leukemia were included in the study. The slides of bone marrow aspirates were reviewed by the attending oncologist/hematologist. Data was analyzed in database management system.

Results

In the two year study period, 1000 cancer patients were seen of whom 115 (11%) were children (under 15 years age). The commonest childhood malignancy encountered was leukemias accounting for54% (or 62 cases). Second commonestwas non-Hodgkins lymphoma (16%) Eighty-two percent were acute lymphoblastic leukemias, 16% were acute myeloid leukemias, with a single rare case of chronic myeloid leukemia.

Acute Lymphoblastic Leukemia

Fifty-one cases of acute lymphoblastic leukemia were seen ranging in age from 2.5 to 15 years (mean age 8.1 years). A significant peak occurred at 2.5-5 years.

ALL showed a predominance for boys with a male to female ratio of 1.6:1. Majority (66%) of patients belonged to middle socioeconomic group followed by low socioeconomic status (28%). Six percent patients were from the high socioeconomic strata. Eight patients gave histozy of prolonged exposure to insecticides/pesticides.

The patients had been healthy prior to developing acute lymphoblastic leukemia with no history of prior hematological or oncological problems. No clustering of leukemic cases were seen within the family. The duration of symptoms ranged from 10 days to 6 years with a mean duration of 165 days (or 5.5 months). Fifty-six percent patients belonged to the performance status I and H (as defined by the WHO criteria) on presentation, 44% to performance status III and IV. The commonest complaint was fever (79%), followed by bone pains (67%) and weight loss/malaise (40%). Almost half of the patients (47%) had bleeding diathesis on presentation, 58% had hepatomegaly and 60% splenomegaly. Lymphadenopathy was present in 66% of cases (Table).

Table. Clinical features at diagnosis in children with acute lymphoblastic leukemia.

Clinical features	% of patients
Fever	79
Bone pain	67
Bleeding	47
Lymphadenopathy	66
Splenomegaly	60
Hepatomegaly	57

Majority (87%) of our patients had received no prior chemotherapy or radiation, 11% received chemotherapy in another institution and one patient had chemotherapy, radiotherapy and bone marrow transplantation earlier.

Acute Mycloid Leukemia

Of the 62 leukemia patients, 10 (16%) had acute myeloid leukemia. The male to female ratio was 2:1 and 78% belonged to middle class and 22% te low socioeconomic status. The age of patients ranged from 3-15 years with a mean of 10.6 years and a median of 10 years. The small number of patients did not allow determination of peak age distribution.

The duration of symptoms prior to presentation ranged from 20 days to 10 months with an average of 5 months. No patient had an obvious history of exposure to chemicals or radiation and had been healthy prior tO the present illness.

On presentation, 51% of patients had a performance status of I or II and 49% of III and IV The main complaints were fever (67%) followed by weakness, malaise, weight loss, bleeding/purpura and pallor, all of which were equally frequent (33% in each category) and 67% had bleeding problems on admission. A smaller number of patients had hepatomegaly (22%) and splenomegaly (33%) as compared to patients of ALL. Lymphadenopathy was seen in 32% of cases; 78% of patients had no previous therapy whereas 22% had received chemotherapy earlier.

Discussion

Relatively little is known about the epidemiology, etiology and incidence of childhood cancers in developing countries. The incidence of ALL here s considerably lower as compared to the developed ones and as reported from Nigeria, India, China and Egypt[7]. The presented study indicates that of all paediatric cancers the commonest was leukemias (54%) with 82% being ALL and 16% AML. This distribution of leukemias is similar to the data reported in literature[8].

The percentage of leukemias reported from the Armed Forces Institute of Pathology (AFIP), Rawalpindi, Pakistan, were somewhat different. Out of 840 cases of neoplasia seen during 1977-1988, 5.99% of all tumours were seen in the paediatric age group (<15 years) and acute leukemia was seen in 35.18% of all cases of paediatric malignancies[9]. This is similar to the reports of cancer statistics from U.S.A[5]. The age specific 10 peak of 2-5 years for ALL noted in the U.K. and U.S.A. [10] is also present in our small sample. It is important to mention that this peak was not observed in many developing countries[11-13].

The possible association of ALL with high socioeconomic status has been suggested by Magrath and McWhister[14,15] But most of our patients belonged to the middle socioeconomic class. Majority of our patients gave no history of direct exposure to pesticides and chemicals. However, this is due to illiteracy and lack of awareness about these environmental contaminants. The use of pesticides is wide spread in our country and a study conducted in Baluchistan reported a higher concentration of chlorinated hydrocarbon residues than seen in Germany[16]. The indiscriminate use of fertilizers has caused accumulation of nitrates in wheat as reported earlier. High lead content in turmeric, cereal and canned food and forages has been documented. The consumption of forages by animals has also led to accumulation of lead in their milk and meat products. High content of lead is also found onfruit being sold on roadside due to fumes from leaded gasoline. Mercuiy contents in various food grains is much higher than permissible limits due to industrial effluent being discharged in agricultural waters. Among synthetic food colours banned by FDA Amaranth which is both carcinogenic and embryotoxic was found in 62.5% of food samples[17].

A high prevalence of maternal and fetal malnutrition in our country is associated with altered development of immune system alongwith depressed T cell function[18]. This leads to widespread EBV infection generally acquired at an early age. Magrathet al have recently shown a strong association ofEBV Virus with childhood lymphoproliferative disorders in Pakistan. This combination of malnutrition, frequent infections, altered development of immune system and depressed T cell function may lead to unregulated polyclonal B cell proliferation in response to antigenic stimulation.[19] This may

cause monoclonal proliferation and probable malignant tmnsformation in accordance with the Gmaves hypothesis20 and contribute towards the etiopathogenesis of childhood leukemia.

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