Incidence of B-cell Leukemia Among Kurdish People in Erbil City

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Abstract
This study was carried out in Nanakaly hospital for blood disease in Erbil city, during November 2013 to November 2014. The study was designed to investigate the prevalence of different types of leukemia in Erbil Province in Kurdistan Region. 138 cases were studied of different types of leukemia diagnosed by peripheral blood count, peripheral blood smear examination, bone marrow aspiration and immune-phenotyping by flow cytometry. The results showed that from 138 patients, 68 (49.28%) patients suffered with B-cell lineage disorders, while 44 (31.88%) patients afflicted with myloid lineage disorders followed by 13 (9.42%) patients affected with T-cell lineage disorders. The results showed that from 68 patients, 38 (55.88%) affected with acute lymphocytic leukemia (ALL) followed by 26 (38.24%) chronic lymphocytic leukemia (CLL), 3 (4.41%) and 1 (1.47%) of patients represent hairy cell leukemia (HCL) and Burkett’s lymphoma respectively. The result indicated obvious relation between age and B-cell leukemia, BALL was most frequent in children and B-CLL related to older age.

Keywords: Epidemiology of leukemia; B-cell leukemia; risk factor, Erbil

Introduction
Cancer can be defined as a disease in which a cell of group of abnormal cells grow uncontrollably by upregulation of the normal rules of cell division and can invade nearby tissues [1]. Cancer is set to become a major cause of sickness, morbidity and mortality in the future decades in every region of the world [2]. Today, Cancer is the leading cause of death in economically developed countries and the second leading cause of death in developing countries [3].

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Among the different types of cancers, leukemia appears to have greatly increased in frequency. They are diseases characterized by malignant proliferation of the blood cells of the blood and bone marrow. Stem cells are converted into blood cells through various steps. Each step is regulated by cytokines and growth factors through their respective or special receptors present on cell surface. Any change in this regulation can lead to the leukemia [4, 5].

According to Iraqi cancer registry (2008), leukemia ranks the fourth of all malignant diseases, and the first among the commonest ten cancers in children. B-cell leukemia ranks the fifth of all leukemia [6]. The etiology of leukaemia remains unknown but it may be the result of a complex interaction between host susceptibility factors and different environmental susceptibility agents [7]. The leukemia diagnosis is defined according to its characteristics and cell type origin. Leukemia is either chronic or acute. Furthermore, leukemia typing is also based on the type of white blood cell that is affected. There are four major types of leukemia according to their severity such as: acute myeloid leukemia (AML), acute lymphoblastic leukemia (ALL), chronic myeloid leukemia (CML), and chronic lymphocytic leukemia (CLL) respectively. Most acute leukemias are classified as lymphoid or myeloid lineages via standard cytochemistry, microscopic morphology, and immunophenotyping [8, 9].

B-CLL is a malignancy of naïve B-cells which is characterized by the progressive accumulation of mature B-cells which are blocked in early G1 of the cell cycle and are unable to undergo programmed cell death, with a characteristic immunophenotype [10, 11]. CLL is the most common leukemia in adults [12].

B-ALL is characterized by abnormal clonal expansion of developmentally arrested B-cell precursors in the BM that disseminate into other compartments. It is the most common form of paediatric cancer [13, 14].

The aim of this study is to investigate the prevalence of different types of leukemia in Erbil Province in Kurdistan Region.

Materials and Methods

A total of 138 patients suffering from different types of leukemia were investigated at Nanakaly Hospital for blood disease in Erbil city from November 2013 to November 2014. Forms were developed in order to have complete knowledge of patients which include age, gender, case history, physical and laboratory examination reports. The study include 68 newly diagnosed B-Cell leukemia patients according to FAB classification which included clinical symptoms, peripheral blood count, peripheral blood smear examination, bone marrow aspiration and flow cytometer. None of the patients had a previously diagnosed leukemia and none of the patients had
received chemotherapy for a non-hematologic disease. Most but not all patients were from Erbil.

**Statistical analysis**

Data were evaluated statistically, analyzed and organized in tables. Computer program software Statistical package for Social Sciences (SPSS); version 18 was used to analyze the data. Quantitative variables were compared using the Students F-test and t-test. Results were considered significant, if the P value was less than 0.01 and 0.05.

**Results and Discussion**

Distribution of the patients according to types of leukemia Figure (1) represent percentage of the patients according to types of leukemia, in one year at Nanakaly hospital in Erbil-city. The numbers of patients were (138) that carried out their results from FC unit. The result showed that most patients suffered with B-Cell lineage disorders which represent 68(49.28%) patients, 44(31.88%) patients afflicted with myeloid lineage disorders, 13(9.42%) patients affected with T-Cell lineage disorders, 6(4.35%) patients had trouble with Non-Hodgkin's Lymphoma, and 7(5.07%) patients had problems with other type of blood disorders.

![Types of Leukemia](image)

**Figure 1. Distribution of patients according to types of leukemia**

A study on leukemia childhood at Tripoli medical center department of Pediatric Oncology in Libya; revealed that 68% of the participated patients suffering from ALL and 15% AML, and the paternal age may increase the risk factor of child leukemia [15]. While another study done by Al-Ghazaly et al., in Yemen found that AML was the most common type of leukemia (45.1%) followed by CML (26.5%), ALL (17.7%) and CLL (10.7%) respectively, and there was an almost equal prevalence of AML and CML for males and females but males had significantly more cases of ALL and CLL [16].
Also the data had similarities with results obtained by Hamasaeed; showed 50 patients of B-Cell disorders in total 100 newly diagnosed leukemia patients and 30 AML patients with 16 cases of T-lineage disorders [17]. However, it is different from that seen in USA and other Western countries where CLL is the most common form of leukaemia [18]. This may indicate a different exposure to certain etiologic factors.

Results gained in our study showed that the percentage of B-Cell disorders more than other types of leukemia, because of its prevalent in children, while T and myeloid disorders are more aggressive than it, and the other type usually progress slowly and less aggressive when compared with B-Cell lineage leukemia [19]. According to the lineage, our study was agreed with a study gained by Ibagy et al. (2013) found that B-cell lineage predominant (73%) and not aggressive like T-lineage that might be detected in pre-stages, but the T-cell line was statistically significant for death more than B-cell line [20]. Also it is agreed with these results B-ALL (73.6%) and T-ALL (26.4%) [21].

This result raises the question about the effect of environmental pollution on the specific characteristics of leukemia rather than on the overall incidence rate. As happened in Basrah region was exposed to environmental insults including the known leukemogen benzene [22] and pyrophoric depleted uranium [23] as well as undifferentiated water and air pollution [24].

Figure (2) illustrated B-Cell leukemia which distributed according their aggressiveness, from 68 patients, 38 (55.88%) patients affected with ALL, 26 (38.24%) patients had CLL, 3 (4.41%) and 1 (1.47%) patients represent HCL and Burkett’s lymphoma respectively. Results obtained in this study showed that percentage of ALL was more prevalent than CLL, because ALL usually gets worse rapidly and appear quickly, while CLL usually progress slowly when compared to ALL.

![Figure 2. Frequency of B-Cell leukemia according to aggressiveness](image-url)
Similar finding has been reported in a study done in India by Rathee et al. that ALL was more prevalent than CLL [25]. Also there were similarities with the results of several previous studies [26]. However, a markedly high incidence of CLL has been reported by some another studies [14], however most cases of CLL in our community may not be diagnosis because it was taking months and years to progress and may be asymptomatic for prolonged period, and often affects the adults [27].

In childhood cancer, the variation of incidence according to gender is well-established worldwide; the incidence of pediatric ALL is consistently higher among males (approximately 20%) relative to females, with a male to female age-adjusted incidence of 1.3. This gender difference is not only observed regarding incidence, but also in regard to prognosis and survival of childhood ALL patients [28].

Gender is one of the features that have consistently shown to be associated with outcome of leukemia in children. The present study showed that there were 19(50%) male with 19(50%) female patients of ALL and 19(73%) male with 7(27%) female of CLL that showed in figure (3). Al-Barazanchi et al., from Iraq found that out of 64 newly diagnosed ALL cases, 61% were children, while 39% were adults [29]. They also addressed the relation between ALL and gender, found that males constituted of 43 cases and females were 21 cases with male to female ratio 2:1. This is similar to a study done in Tunisia in the central region by Jmili et al., in 2004 about the epidemiologic and cytological characteristic of 193 patients with AL, who addressed the predominance of males (ratio1.27:1) and reported that 72% of AL in children less than 10 years of age was ALL [30].

![Figure 3. Frequency of male and female in different type of B-Cell leukemia](image-url)
The results had similarities with that showed (52%) male with (48%) female of ALL and no likeness with (58%) male and (42%) female of CLL [14]. Male to female ratio 1:1 in ALL patients and 2.7:1 in CLL patients in this study not matched to that obtained by other literature which cited a male predominance in pediatric ALL and CLL [17, 22]. Increased incidence of ALL leukemia in males seems to arise as males are comparatively more exposed to occupational and environmental carcinogens as has been suggested by some workers [31, 5].

According to age most of the ALL patients were child 27(71%) and adult number was 11(29%), whereas all CLL patients 26(100%) were adults, figure (4). The mentioned results was agreed with the study of Mohammed et al., in Basrah which they found that 72.5% of ALL patients were child, 51.6% were boys and 48.4% were girls. Whereas 27.5% of patients were adult, while 61.1% were males and 38.9% were females [32]. And also with Rathee et al., that the age has significant effect on type of leukemia and they revealed that ALL was more commonly observed in children whereas both CLL and CML were only observed in adults [25].

![Figure 4. Frequency of child and adult in different type of B-Cell leukemia](image)

**Conclusions**

Present study revealed that B-cell disorders were the most prevalent disorders among all leukemias. Children were most susceptible group for ALL and CLL mostly occur in older age. Males jeopardize to CLL and HCL more than females.
References


