Epidemiological Study of Chronic Myeloid Leukemic Patients

Welaas Salih AL-leban1, Amel Ali AL-Taee2, Hallamuhee3, Hayder M.A. Shweliya4

Babylon University College of Science

Abstract: This study was aimed to evaluated the causative agents of chronic myeloid leukemia (CML), it was involved collecting of (92) samples from CML patients with ages of (6 month - 76 year) from cancer center of Mergan hospital in Babylon city. The parameters included ABO blood group, age, sex, history of family (Pedigree analysis) and smoking. Statistical analysis showed the presence of variable significant differences (p≤0.05) in the values, by which the incident was high in patient’s of blood group A (30.45%), the percent of male in age group (31-40 years) was (28.51%) in contrast with the other groups, male (59.13%) than female (41.3%), positive family history was (26.5)% while it was 73.47% in family of negative history, and smoking patients (58.69%). Conclusion: blood group A, small age group, male, smoking patients were the most frequent to incident with CML in comparing with the other.

Keywords: chronic myeloid leukemia, CML, ABO, sex, age

I. Introduction:

Leukemia disease defined as group of malignant disorders and abnormal growth of White blood cells recognized by accumulation of immature blast cells in red bone marrow and peripheral blood afterward these cells remain immature and their growth stop at certain limit of their growth phase after that increasing of their number occur in peripheral blood circulation and then penetrate in to other organs leading to function failure of these organs. Causes of blood leukemia not known precisely but scientists and researchers suspect of multiple factors such as viral, genetic, environmental, and immunological involved in this disease etiology(1).

Leukemia can be classified into four main types include: Acute lymphocytic leukemia (ALL), it is the most widespread category in young children and so it get adults. It is affected 3,800 new cases every year, Acute myeloid leukemia (AML) affects children and adults, its incidence about 10.600 new cases of leukemia each year. While chronic leukemia usually occur in adults. Which involve Chronic myeloid leukemia (CML) and chronic lymphocytic leukemia (CLL) affect about 4.400 - 7.000 novel cases of leukemia every year respectively.

Chronic myeloid leukemia have the ability to extension in myeloid and lymphoid lineage, which include megakaryocyte, erythroid, monocytic, myloid, B-lymphoid, occasionally T-lymphocytic lineage, but the granulocyte expansion in myeloid lineage is predominant. CML is odd malignancy in that a one oncogene product is central to its pathology(3).

The CML divided into three stages (4):

- Chronic phase: Approximately 85% of CML patients diagnosed in this phase, which can continue for 2-7 years and in rare case 15-20 years.
- Accelerated phase: Intermediate stage by which 50% of CML cases developed in this phase gradually into blast phase which may continue months or years, this phase characterized by the 15-29% ratio of blast cells, and blast cells and promyelocytes more than 30%.
- Blast phase: In this phase 30% or more of blast cells can be diagnosed by blood and red bone marrow tests, this phase characterized by changing into acute lymphoid leukemia or acute myeloid leukemia.
- Generally the formation of malignant cell is accepted as multistep process, the first indication for this come from epidemiological studies, when it was detected that the overall repeatedly of cancers as a function of age favourable a straight line on log-log plot, supposing that tumor result as a cumulative succession of irregular events.

Pedigree analysis of cancer give a concept for genetic and environmental risk factors, family histories of breast, lung, colon and other tumors have been associated with same cancer dangerous factors firmly with a shared etiology with in families(5).
II. Material and Method:

Sample collection:
Samples from chronic myeloid leukemia patients were collected from the cancer center of Mergan hospital in Babylon city for 6 months period, this study was focused on some parameters including ABO blood group, age, sex, history of family (Pedigree analysis) and smoking. By using the following formula:

<table>
<thead>
<tr>
<th>Formula</th>
<th>Age:</th>
<th>Sex:</th>
<th>Address:</th>
<th>Smoker:</th>
<th>Non-smoker:</th>
<th>Smoking period:</th>
<th>Disease date:</th>
<th>Disease history of family</th>
</tr>
</thead>
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<table>
<thead>
<tr>
<th></th>
<th>Non-smoker:</th>
<th>Smoker:</th>
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<tr>
<td>smoking period:</td>
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<td>Address:</td>
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<td>Disease history of family</td>
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<tr>
<td>Ant &amp; uncle:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relatives:</td>
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</tbody>
</table>

III. Results:

In this study we found significant differences (P<0.05) in the parameter used in this study by which the incident was high in patients of blood group A (30.45%) (Fig. 1), the male of age group (31-40 years) was (28.51%) (table,1) in contrast with the other groups, male (59.13%) than female (41.3%) as in (Fig.2), positive family history was (26.5%) while it was (73.47%) in family of negative history (Fig. 3), and smoking patients (58.69%) (Fig .4).

Table (1): Patients distribution according to age

<table>
<thead>
<tr>
<th>age</th>
<th>1-10</th>
<th>11-20</th>
<th>21-30</th>
<th>31-40</th>
<th>41-50</th>
<th>51-60</th>
<th>61-70</th>
<th>71-80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>7.3</td>
<td>3.7</td>
<td>12.95</td>
<td>28.51</td>
<td>23.46</td>
<td>12.95</td>
<td>14.8</td>
<td>3.7</td>
</tr>
<tr>
<td>Female</td>
<td>5.43</td>
<td>2.16</td>
<td>15.14</td>
<td>21.73</td>
<td>24.99</td>
<td>15.2</td>
<td>13.03</td>
<td>2.16</td>
</tr>
</tbody>
</table>

Figure (2): patients distribution according to sex
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IV. Discussion:

Epidemiological study can play a vital role in understanding the occurrence and outcome of the disease. Significant results have been obtained on the association of ABO blood groups and different cancers like duodenal ulcer (6), gastric cancers etc. But, several other diseases have been investigated for such association with statistically insignificant results (7). The tendency of leukemia to occur less frequently in persons of group O than in persons of group B and AB, for the Chronic Leukemias According to (12) study showed that duration of blood group B for CML patients are significantly longer than for patient of other groups. While (8) study nullifies the concept of tendency of any particular blood group toward leukemia.

There were many studies described for the association between ABO blood group and certain disease, such as the relation between blood group individuals with increase incidence of gastric carcinoma and duodenal ulcers (9). Abnormal expression of ABO antigen have been noticed in pre-malignant and malignant cells. Leukemic individuals had weakness of ABO antigens detected by serological analysis in patients case reports, especially in myeloid lineage (10;11).

The risk of death from all forms of leukemia is greater in male than for female in both races the ratio being 1.5 for each race (12). As observed in our information of this study CML show higher risk incidence in male representing the overall ratio of 1:8.1. Our explanation that the higher risk of incidence in male due to the nature of their jobs and hormones.

According to the patients survival rate by age group, the older leukemic patients at diagnosis had lower survival rate, also older patients had an increased incidence of cytogenic abnormalities associated with poor prognosis, especially Philadelphia chromosome. The incidence of leukemia for all types increases steadily with age, exception of ALL which increases during early childhood (13) While in our study in Iraq, the result showed...
that the incident was appears in small age group (6 months) and high incident was revealed in (31-40year) in percent of (28.51%) which attributed to aware, environmental pollution, chemicals and radiation.

Tobacco smoke contain several chemical compounds ,two of these are benzene and ionizing radiation which can play a vital role as a leukemogens . it has been found an significant increasing of benzene concentration in urine of smokers than in non smokers (5) ionizing radiation is present in tobacco smoke as lead210 and polonium210(14,15).Benzene metabolite can be considered a deleterious factor causing DNA damage and impairing DNA repair system in hematopoietic cells in bone marrow (16).Benzene cause an activation phenolic compound in the liver later transfer of these metabolite to bone marrow then formation active oxygen species through redox cycling and consequently damaging chromosome translocation, mitotic recombination and aneuploidy (17) if these influence occur in stem cells a leukaemic clone a rise ,as a consequence of protooncogene performance, suppressor gene inactivation and gene fusion. other study (18) indicate that cigarette smoke cause an increase in micronuclei establishment and chromatin exchange in myeloid and lymphoid tissues regarding a genotoxic influence from smoking. Smoking is also associated with immunologic confusions such as rising in lymphocyte count, an increases in cd4+ cells and there by an increase in cd4+/cd8+ ratio (19,20).

Several studies showed an association between leukemia and chemicals compound of smoking ,that can produce a disturbance in chromosomes 5,7, and 8 (21,22,23,24,25,26) which have been linked to myeloid leukemia And A bad prognosis especially after treatment. and so smoking exceeds the risk of pulmonary infections in individuals with myeloid leukemia (26) through induction therapy also affects allogeneic transplant outcome (28).

Our information show appositive family history for CML individuals about 26.51%, which represent a high incidence ratio, we thought that these individuals shared the same genetic and environmental factors for leukemia.

References:

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