# A Review Of 170 Cases of Acute Leukemias

F I BUTT Y LODHI
Department of Pathology, Allama Iqbal Medical College, Lahore

Correspondence to: Fauziya I. Butt

**A retrospective review study was carried out from the cases of acute leukemia diagnosed at the Pathology Department of Allama Iqbal Medical College, Lahore, over a period of five years, from 1994-1998. Out of a total of 170 cases there were 88 patients (52%) diagnosed as acute myeloid leukemia (AML); 79 patients (46%) with acute lymphoblastic leukemia (ALL); and 3 patients (2%) with acute undifferentiated leukemia (AUL). They were classified according to the French-American-British (FAB) classification by Giemsa stain and cytochemistry (Sudan Black, periodic acid-Schiff stain (PAS), à-naphthyl acetate and chloracetate esterases). The study showed M2 as the predominant type of AML with 34 patients (39%); and 46 patients (58%) were of L2 which was the predominant type of ALL. Their blood picture and bone marrow picture were reviewed.**

**Key words: Acute myeloid leukemia, Acute lymphoblastic leukemia, Acute undifferentiated leukemia, Haemoglobin, Total leucocyte count, Sudan Black B stain, Period acid-Schiff stain**

Leukaemias are the malignancies of haemopoietic cells. They can be grouped into acute and chronic forms. Both these forms have a lymphocytic and a myelocytic variety[1-2]. The acute leukaemias are the blast cell leukaemias or malignancies of the immature haemopoietic cells whereas the chronic leukaemias involve the more mature cells[3]. The acute leukemias comprise more than 50% of all the leukemias that are diagnosed[1]. They are divided into two main groups in individuals according to age: (i) childhood leukemia in <15 years, (ii) adult leukemia in ò15 years age. A third group can be formed which is in adults ò50 years age. In the latter the response to treatment is poor and they are not treated by bone marrow transplant[3]. Acute lymphoblastic leukemia comprises 80% or more of the childhood leukemias whereas in adults acute myeloid leukemia constitutes about 80% of the acute leukaemias[3]. Diagnosis of acute leukemia is made by peripheral blood examination and bone marrow biopsy.

Acute leukemias are classified according to the FAB classification by May-Grumwald-Giemsa staining and cytochemistry of the peripheral blood and bone marrow smears[4-5]. Flow cytometry, immunological and cytogenetic studies are further techniques used for typing of leukemias. Exact typing helps in the treatment, management and prognosis of the patient[2,6-8].

## Patients and Methods

This retrospective review study was carried out from the cases of acute leukemia diagnosed at the Pathology Department, Allama Iqbal Medical College, Lahore, over a period of five years, from 1994-1998. The patients were referred from Services Hospital and Jinnah Hospital, Lahore.

Routine blood examination and bone marrow biopsy was performed. Peripheral blood and bone marrow slides were stained with Giemsa stain[9]. Special stains like PAS, Sudan Black, à-naphthyl acetate and chloracetate esterases were performed to confirm the diagnosis (Sigma Co., Kit method). With the help of morphology and cytochemistry the acute leukemias were classified according to the FAB classification[4-5].

## Results

A total of 170 cases of acute leukemia were studied from 1994-1998. Out of these 88 patients (52%) were of acute myeloid leukemia (AML), and 79 (46%) were diagnosed as acute lymphoblastic leukemia (ALL), showing a slight preponderance of AML over ALL. Three patients (2%) were grouped under acute undifferentiated leukemia (AUL) as with cytochemistry there were no positive results (Table 1).

Table 1 Types of leukemia

| Types | N= | %age |
|---|---|---|
| Acute myeloid leukemia | 88 | 52.0 |
| Acute lymphoblastic leukemia | 79 | 46.0 |
| Acute undifferentiated leukemia | 3 | 2.0 |

In AML the mean age was more as compared to ALL (Table 2). It ranged from 2-65 years in both types of leukemia with a mean of 30.5ñ17.5 years in AML and 19ñ17 years in ALL. The age distribution showed ALL predominating between the ages of 0-10 years; while in the remaining age groups AML was predominant. The peak incidence of ALL was between 0-10 years; there were 34 (43%) patients. Acute myeloid leukemia showed highest incidence between 11-20 years with 27 (31%) patients (Table 2).

Table 2 Age incidence of leukemia

| Age (years) | Acute myeloid leukemia | Acute lymphoblastic leukemia |
|---|---|---|
| 0-10 | 7(9%) | 34(43%) |
| 11-20 | 27(31%) | 17(22%) |
| 21-30 | 17(19%) | 11(14%) |
| 31-40 | 12(13%) | 8(10%) |
| 41-50 | 10(11%) | 3(4%) |
| ·50 | 15(17%) | 6(8%) |
| Mean±SD | 30.5±17.5 | 19±17 |

The sex incidence showed males predominating the females in both types of leukemias with minor difference in the male female ratio. In AML there were 62 (70%) male patients and 26 (30%) females with a male female ratio of 2.5:1. In ALL there were 54 (68%) males and 25 (32%) female patients showing a male female ratio of 2.1:1 (Table 3).

Table 3 Sex incidence of leukemia

| Types | Male | Female |
|---|---|---|
| Acute myeloid leukemia(n=88) | 62(70%) | 26(30%) |
| Acute lymphoblastic leukemia(n=79) | 54(68%) | 25(25%) |
| Acute undifferentiated leukemia(n=3) | 1(33.3%) | 2(66.6%) |

Typing of AML according to the FAB classification showed 11 cases (12%) of M1; 34 (39%) of M2 type; there were 16 (18%) of M3 type; 21 (24%) of M4; and 6 (7%) were M5. No case of M6 was diagnosed in this series. In ALL there were 28 (35%) of L1 patients; 46 (58%) of L2; and 5 (6%) of L3 cases (Table 4).

Table 4 FAB classification of leukemia

| Types | Number | Percentage |
|---|---|---|
| Acute myeloid leukemia | | |
| M1 | 11 | 12.0 |
| M2 | 34 | 39.0 |
| M3 | 16 | 18.0 |
| M4 | 21 | 24.0 |
| M5 | 6 | 7.0 |
| Acute lymphoblastic leukemia | | |
| L1 | 28 | 35.0 |
| L2 | 46 | 58.0 |
| L3 | 5 | 6.0 |

All the patients presented with anaemia. The haemoglobin level varied from 2.9-10.9 Gm/dl in AML with a mean off 7.2±1.9 Gm/dl. In ALL the range was from 3.5-9.7 Gm/dl with a mean of 6.6±1.9 Gm/dl, thus showing lower haemoglobin level in ALL (Table 5).

Leucocytosis (WBC >10x109/L)was seen in 56 patients (63%) of AML, and 50 patients (63%) with ALL. Leucopenia, (WBC <3x109/L) was observed in 10 cases (11%) with AML, and 8 (10%) patients with ALL. The range of TLC in AML was 1.2-200x109/L giving a mean of 41.7±51.6x109/L; whereas in ALL it ranged from 0.9-180x109/L with a mean of 36.7±46.7x109/L (Table 5).

Thrombocytopenia was a common presenting feature in the patients. Only 3 patients (4%) of AML and 4 cases (5%) of ALL presented with normal platelet counts. In AML the count varied from 9-318x109/L with a mean of 50±46x109/L and in ALL the count was from 10-236x109/L giving a mean of 51±43x109/L (Table 5).

Blast cells in the peripheral blood ranged from 3-96% in AML; and from 3-91% in ALL. In the bone marrow there were 36-99% blasts in AML; and 40-99% in ALL (Table 5).

All cases (100%) of AML were Sudan Black positive. ALL patients showed PAS positivity in 64 cases (81%). Chloracetate esterase was positive in 28 patients and à-naphthyl acetate esterase in 16 patients with AML.

Table 5 Blood picture of leukemia

| Values | Acute myeloid leukemia | Acute lymphoblastic leukemia |
|---|---|---|
| HB (Gm/dl) | | |
| <4 | 6 | 8 |
| 4-8 | 51 | 51 |
| 8-12 | 31 | 20 |
| Mean±SD | 7.2±1.9 | 6.6±1.9 |
| WBC (x109/L) | | |
| <5 | 17 | 15 |
| 5-10 | 15 | 14 |
| 10-50 | 33 | 33 |
| 50-100 | 10 | 8 |
| >100 | 13 | 9 |
| Mean±SD | 41.7±51.6 | 36.7±46.7 |
| Platelets (x109/L) | | |
| <50 | 63 | 51 |
| 50-100 | 19 | 20 |
| 100-150 | 3 | 6 |
| >150 | 3 | 2 |
| Mean±SD | 50.1±46.0 | 51.3±43.5 |
| Blasts % in blood | | |
| Upto 20 | 12 | 19 |
| 21-50 | 22 | 21 |
| 51-90 | 48 | 38 |
| >90 | 6 | 1 |
| Mean±SD | 57±28 | 48±29 |
| Blasts in bone marrow (%) | | |
| 25-50 | 7 | 6 |
| 51-90% | 47 | 43 |
| >90 | 34 | 30 |
| Mean±SD | 83±17 | 83±16 |

## Discussion

In this study all the patients (100%) with acute leukemia presented with anaemia. Thrombocytopenia was present in majority of the patients. Three cases (4%) of AML and 4 cases (5%) of ALL presented with normal platelet counts. In a study carried out in 293 cases of leukemias in children, all cases of ALL in childhood presented with anaemia and thrombocytopenia[10]. In the present study leucocytosis was observed in about two-thirds of patients (63%) of both types of leukemia. This finding is consistent with the findings of a study carried out by Poplack et al[7].

Age of the patients at the time of presentation was considerably lower in ALL. Highest incidence for ALL (43%) was between 0-10 years; whereas for AML it was 31% between 11-20 years of age. Maximum incidence of ALL was also found between 0-10 years in other studies carried out by Qureshi, Iftikhar et al, and Ahmad et al.[8,10-11].The mean age of presentation for AML in this study was 30.5±17.6 years; which is the same as in a study carried out in Saudi Arabia[12] but is lower as compared to another study carried out in Middle Norway[13].The sex incidence showed males predominating, the ratio being 2.5:1 for

AML and 2.1:1 for ALL. Male preponderance was also seen in studies carried out by Qureshi, Iftikhar et al, and Harakati et al[8,10-12] but the ratio was higher in our country[8,10]. This is probably due to better health care of males in our society.

In the peripheral blood the percentage of blast cells varied from 3-96% in AML with a mean of 57±28%. In ALL the range was from 3-91% having a mean of 48ñ29%. Similar findings were observed by other authors.[1,10].

FAB classification of AML showed M2 type predominating with 39% patients. M4 type was next in prevalence with 24% cases. This is in concordance with Whittaker and his associates[14] but is in contrast to a study carried out in Saudi Arabia where M4 type was predominant[12]. FAB classification of ALL showed predominance of L2 type (58%) and 35% of L1 type. This is in contrast to studies carried out by Bennet and his associates[4] and Iftikhar[10] This is probably because this study included children as well as adults; and in adults L2 is the common type of ALL.[7]

There were three cases (2%) classified as AUL since by Giemsa stain and cytochemistry we could not definitely place them in any group. Such cases have been classified as AML-M0 type by other workers[3,15] with the help of positive peroxidase staining as seen under the electron microscope. Such facility was not available in our setup.

This study showed that although ALL was prevalent in childhood, but AML was noted as frequently as ALL. The age of onset of AML was also relatively younger. The youngest age at which it was diagnosed was 2 years. AML-M3 type had a significant prevalence of 18%. However these figures need further evaluation and further studies need to be carried out on a larger scale.

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