A Study of Clinical Haematological and Morphological Features of Acute Myeloblastic Leukemia

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One hundred and forty three patients of acute myeloblastic leukaemia were diagnosed during a five years period from January 1996 to December 2000 at the Haematology Department of King Edward Medical College, Lahore. The clinical, haematological and morphological features of these patients were studied. The cases were classified into various FAB types based on morphology and cytochemical stains. Ninety seven (67.83%) of the patients studied were males while 46(32.16%) were females giving a male to female ratio of 2.1:1.Maximum number of patients were in the 15-25 years age group. Symptoms relating to anemia were present in nearly all patients at presentation while fever was present in 65%patients and bleeding manifestations in 31.4%. Hepatomegaly, splenomegaly and lymphadenopathy were seen in 51%, 34.9% and 25% of patients respectively. The peripheral smears of all patients showed the presence of blast cells. M2 was the most frequent FAB type seen and was diagnosed in 47.55% of patients followed by M1(20.27%), M4(13.28%) and M3(11.18%).M6 and M5 were diagnosed in 4.19% and 3.49%of patients respectively.

Key words: Acute myeloblastic leukemia

The acute leukemias are a group of neoplastic diseases that are characterized by proliferation of immature white cells in the bone marrow and blood and often associated with severe leukopenia, anemia and thrombocytopenia[1]. Acute myeloid leukemia (AML) is a disease that results in the accumulation of immature myeloid cells in the bone marrow and peripheral blood[2]. It is general practice to follow the guidelines established by French American British (FAB) classification system for diagnosing acute leukemia subtypes[3]. This classification depends on identifying the cell lineage of the major cell population of the blast cells based on morphological and cytochemical grounds[4]. Futhermore this cytologic classification can now be integrated with immunologic and cytogenetic findings which represent important tools for a better definition of the biological characteristics and prognosis of AML[5].

The present study was carried out on 143 patients of acute myeloblastic leukemia diagnosed at the Haematology Department of King Edward Medical College. The objective of the study was to analyze the clinical and haematological features of these patients and to see the distribution of various morphological types according to the FAB Classification.

Material and methods

Cases were collected from patients presenting at the Hematology Department of King Edward Medical College from January 1996 to December 2000. A total of 143 patients were included in the study. Detailed history of each patient was taken followed by a physical examination. Haemoglobin (Hb) estimation, total leucocyte counts (TLC) and platelet counts were done by Cobos (Minos STE) while low platelet counts were rechecked on Neubauer chamber.

Peripheral blood smears were stained with May–Grunwald-Giemsa stain and examined for the presence of blast cells. Bone marrow aspiration was performed on all patients from the posterior iliac crest. The aspirate smears were stained by May-Grunwald-Giemsa stain supplemented in appropriate instances by the following cytochemical stains: Sudan Black B (SBB), Periodic Acid Schiff (PAS) and Alpha Naphthyl Acetate Esterase (ANAE) and Chlor Acetate Esterase[6]. These stains were from Sigma Diagnostics and the staining was done according to the instructions provided by the manufacturers.

Results

Out of a total 143 patients included in the study 97(67.83%) were males and 46(32.16%) were females. The male to female ratio was 2.1:1. Ages of the patients ranged from 2 years to 75 years. The age distribution of the patients is shown in table I . Maximum number of the patients were in the age group>15-25 years

Table 1. Age and sex distribution in 143 cases of Acute Myeloblastic Leukaemia:

Age Group	Upto 5 years	>5-10 years	>10-15 years	>15-25 years	>25-35 years	>35-45 years	>45years
Male	6	6	13	31	12	9	20
Female	3	7	6	7	7	11	5
Total	9	13	19	38	19	20	25
%age	6.29	9.09	13.28	26.57	13.28	13.98	17.48

The clinical findings of the patients are summarized in Table II. Pallor was present in nearly all patients while history of fever and bleeding from various sites was obtained in 65% and 31.4% of cases respectively. Hepatomegaly was observed in 51% of patients and splenomegaly in 34.9% while lymphadenopathy was seen in 25%. Five patients showed gum hypertrophy while orbital proptosis was present in 3 cases.

Table II. Clinical findings on presentation

Clinical Finding	No. of Cases	%age
Pallor	138	96.50
Fever	93	65.03
Hepatomegaly	73	51.04
Splenomegaly	50	34.96
Bleeding Manifestation	45	31.46
Lymphadenopathy	36	25.17
Gum Hypertrophy	5	3.49
Orbital Proptosis	3	1.55

Table III. Peripheral blood counts

Test	No. of cases	%age
Haemoglobin Gm/dl		
<5	40	27.97
5-10	86	60.13
10	17	11.88
Total leucocyte count WBC count (10^9/l)		
<4	39	27.27
4-11	30	20.97
>11-20	17	11.88
>20-50	29	20.27
>50-100	12	8.39
>100	16	11.18
Platelets Count($x10^9$/l)		
<50	34	23.77
50-150	92	64.33
>150	17	11.88

The quantitative peripheral blood data of the patients at presentation is shown in Table III. The haemoglobin (HB) ranged from 2g/dl to 11.5g/dl. 27.97% of patients had a Hb less than 5g/dl, while 11.88% had a Hb above 10g/dl. The rest of the patiens(60.13%) showed Hb levels between 5g/dl and 10g/dl. The lowest WBC count was $0.5x10^9$/L while $466x10^9$/L was the highest count seen in these patients. Severe thrombocytopenia with platelet counts less than $50x10^9$/L was seen in 27.33% of patients, 64.33% of patients showed a platelet count between 50 to $150x10^9$/L while 11.88% had platelet counts above $150x10^9$/L. Nucleated RBCs were seen in 28 patients while blast cells were present in the peripheral smears of 139 patients (Table-IV).

Table IV Frequency of Nucleated RBCs and blast cells in peripheral blood

	No. of cases	%age
Nucleated RBC	28	19.58
Blast cells in Peripheral blood		
Nil	4	2.79
<20	32	22.37
>20-50	36	25.17
>50-80	39	27.27
>80	32	22.37

Based on the morphological appearances of blast cells in bone marrow aspirate and results of cytochemical stains the cases were classified into various FAB types (Table V). M2 was the most frequent type seen and was diagnosed in 68 patients (20.27%) and M4 in 19 patients (13.28%). M3 type was present 16 patients (11.18%) while M5 and M6 accounted for 5 cases (3.49%) and 6 cases (4.19%) respectively.

Table V. FAB Classification in 143 cases of Acute Myeloblastic Leukaemia:

FAB Type	No. of cases	%age
M1 (AML without maturation)	29	20.27
M2 (AML with maturation)	68	47.55
M3 (Promyelocytic leukaemia)	16	11.18
M4(Myelomonoblastic leukaemia)	19	13.28
M5(Monoblastic leukaemia)	5	3.49
M6(Erythroleukaemia)	6	4.19

Discussion

This study conducted on 143 newly diagnosed cases of acute myeloblastic leukemia revealed that males presented more frequently with this disease as compared to females. The maximum number of patients was in the age group >15-25 years and M2 was the most frequent FAB type seen.

The preponderance of males in our study confirms with other studies in the past[7,8]. The frequency of different FAB types also shows similarity to other reported studies in the literature [9,10].

Age and FAB morphology of acute myeloblasstic leukemia have been shown to have an important correlation to prognosis. Infants younger than 2 years of age and elderly patients greater than 60 years have a poor prognosis. As regards prognosis FAB types M5, M6 and M7 are reported to have lower survival rates while M1-M4 carry a more favorable prognosis [11]. Moreover features associated with differentiation in blast cells in particular a higher percentage of Sudan Black B positive cells in the marrow is also reported to be strongly associated with a

higher complete remission rate as well as more durable remission[12].

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