

Frequency of French-American-British subtypes of acute myeloid leukaemia in a tertiary care hospital of Karachi

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Abstract

The aim of this study was to determine the frequency of different subtypes of acute myeloid leukaemia (AML) cases that presented in a tertiary care hospital of Karachi. It was a retrospective cross-sectional study, conducted in the hospital's Oncology department. Data of patients admitted during 2018 was collected from the records. In this study, patients were included using the non-probable convenient sampling technique. Selected cases were classified according to the French-American-British (FAB) classification and data analysis was performed using the SPSS version 25.0. Among the 61 patients included in the study, 28 were males and 33 were females, with a male to female ratio of 1:1.2. The patients' age ranged between 15 and 92 years and the mean age of diagnosis was 36.13±15.5 years. M2 was the most common FAB subtype in 14(29.8%) patients, followed by M1 in 11(23.4%) patients. Myeloperoxidase (MPO) was positive in 44 (71.4%) of those cases.

Keywords: Acute myeloid Leukaemia (AML), French-American-British (FAB) classification.

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Introduction

Acute Myeloid Leukaemia (AML) is a malignancy characterised by an increased number of blast cells in peripheral blood and bone marrow. An increase in blast cell count of more than 30% is diagnostic of AML.¹ Acute myeloid leukaemia presents clinically as a combination of cytopenia, which includes weakness, fever, abdominal pain, pallor and bleeding.² According to the French-American-British (FAB) classification, it is classified into nine subtypes — from M0 to M7. Each subtype is named according to its morphological features, which are as follows: M0 (undifferentiated acute myeloid leukaemia), M1 (acute myeloblastic leukaemia with minimal maturation), M2 (acute myeloblastic leukaemia with maturation), M3 (acute promyelocytic leukaemia), M4 (acute myelomonocytic leukaemia), M4eos (acute myelomonocytic leukaemia with

eosinophilia), M5 (acute monocytic leukaemia), M6 (acute erythroid leukaemia), and M7 (acute megakaryoblastic leukaemia).³ Other diagnostic and prognostic factors include Auer rods and cytochemical enzymes such as myeloperoxidase (MPO), which, when present, predict improved outcome.⁴

According to GLOBOCAN, 18 million people were diagnosed with cancer causing 9.5 million deaths worldwide in 2018, out of which 2.4% were leukaemia cases.⁵ From December 1994 to December 2015, the number of AML patients reported in a single centre study in Pakistan was 2,326, out of which 63% were males.⁶ As reported in a study, the most common type of AML in northern Pakistan was M2 which was 1.5 times more common in males, while in southern Pakistan M4 was seen as the predominant subtype.^{7,8}

Extensive literature search confirmed that AML is one of the least studied cancers in our setup. The current study is a novel attempt to determine the frequency of different subtypes of acute myeloid leukaemia presenting in a tertiary care hospital of Karachi.

Patients and Methods

A retrospective study was conducted in the Department of Oncology, Jinnah Postgraduate Medical Centre to determine the frequency of different subtypes of acute myeloid leukaemia (AML) presenting in the period of the year 2018. Data were collected from the records from January 2019 till May 2019. All records were accessed after approval from the Institutional Review Board and departmental permission. Sampling technique was simple and convenient. Medically diagnosed and registered AML cases of both genders and age 15 years or above were included. Patients younger than 15 years, incomplete reports and documentation were excluded. The data was collected through a self-structured validated questionnaire. It was divided into three sections. The first part comprised demographics, family history and place of presentation. The second section included clinical features at presentation and duration of symptoms. The third section had biopsy and trephine report findings determining the subtypes of cancer. FAB criteria was followed to classify the subtypes of AML.³ Data analysis was performed using SPSS, version 25.0. Descriptive statistics were used to determine

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the mean and standard deviation for numerical variables. Categorical variables were expressed in frequency and percentages. Chi-square/ Fisher Exact test was applied to assess the statistical difference in distribution of the subtypes of AML in the presenting cases. P value of < 0.05 was considered significant.

Results

A total of 61 AML patients including 28 (45.9%) males and 33 (54.1%) females were included in our study. Their mean age was 36.1±15.5 years. Male to female ratio was 1:1.2. The age distribution of the study patients is shown in figure 1.

Almost half of the patients 29 (47.5%) who presented in the oncology ward were residents of Karachi, while 32 (52.5%) were non-Karachiites who travelled from areas outside the city. However, no significant association was present between the residents and the duration of presenting complaint as 30 (49.1%) of the cases had symptoms for more than two months. Only 10 (16.1%) patients had a positive family history for any cancer. Likewise, 10 (16.4%) patients had addictions such as smoking and chewing tobacco . However, many had comorbidities, such as hypertension, diabetes mellitus, and chronic infections. 19 (31.1%) patients had comorbidity along with AML.

Out of 61 patients, 34 (55.7%) presented with complaint of fever, followed by weakness in 20 (32.7%) cases. Some patients also complained of headache, abdominal pain, and epistaxis. Organomegaly was noted in 14 (23.1%) patients, although there were patients who had only hepatomegaly 9 (15.4%) or splenomegaly 7 (11.5%) while 2 (3.83%) patients had lymphadenopathy.

Frequency of AML according to FAB subtypes was calculated which showed M2 as the predominant subtype which was present in 14 (29.8%) patients, followed by M1 in 11 (23.4%) patients as illustrated in Figure 2.

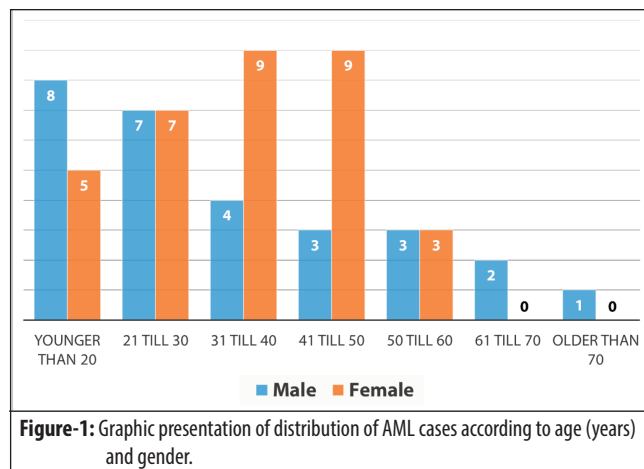


Figure-1: Graphic presentation of distribution of AML cases according to age (years) and gender.

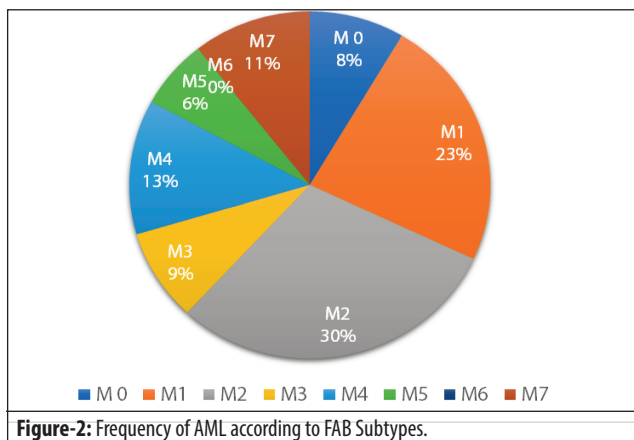


Figure-2: Frequency of AML according to FAB Subtypes.

According to the biopsies, Auer rods were present in approximately 18 (29.8%) of the patients’ reports, followed by megakaryocytes in 12 (19.1%) cases. Blast percentage in bone marrow was noted to be more than 43 (70%) in 36 (59.1%) of the cases. Moreover, in peripheral film, 25 (41.6%) patients had blast count of more than 43 (70%). From 33 cases, reports of different cytochemical stains were collected, it was observed that MPO (Myeloperoxidase) was positive in 44 (71.4%) followed by Sudan black B in 13 (21.4%) patients.

Discussion

AML is a less common malignancy in current study with a frequency of 2.083%, which is little less than the Shaukat Khanum registry report 1994-2006 with 3.7% in adults.⁷ A study conducted at the Aga Khan Hospital showed male dominance with male to female ratio of 1.5:1; however, median age of diagnosis was quite similar to the current study which was 32 years.⁸ Similarly, another study from Pakistan presented slight male dominance at 1.27:1.⁷

M2 (myeloblast with maturation) was the predominant FAB subtype followed by M1 (acute myeloblastic leukaemia with minimal maturation) in our study, while the AKU study conducted in 2005 had M4 (acute myelomonocytic leukaemia) in 36.2% patients, which constituted 12.8% in the current study.⁸ A study from Sudan stated M3 as the most common FAB subtype (29.3%), which was 9% in the current study.⁹ Auer rods, which are pathognomonic markers and indicate good prognosis and better survival, were present in 14 (29.8%) cases, most common in M3 subtype (2/4, or 50%) similar to a prior study from our region,⁸ followed by M1 subtype (4/11, 36.3%), M4 (2/6, 33%), M2 (3/14, 21.4%) and M5 (1/3, 33.3%). Auer bodies were absent in M0 and M7.

Increased blast cell in bone marrow and peripheral film provide strong evidence of AML.1 Consequently 61.7% of our AML cases showed bone marrow blast count of more

than 70%, out of which M1 was the most prominent subtype with 38%. While in peripheral smear, only 22 (36%) cases had more than 79% blast count, of which 11 (50%) were subtype M1. Samples of marrow and peripheral film are collected in the induction and remission phase as early clearance of blast cells has high prognostic importance.¹⁰

Conclusion

AML had a frequency of 2.083 % in our study. The most common FAB subtype was M2 (myeloblast with maturation), followed by M1 (acute myeloblastic leukaemia with minimal maturation). MPO expression has a better prognostic value which was fairly positive in this study.

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Conflict of interest: None.

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