PREVALENCE OF DIFFERENT FAB SUBTYPES OF ACUTE MYELOID LEUKEMIA AT REHMAN MEDICAL INSTITUTE, PESHAWAR: A 12 YEAR STUDY.

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ABSTRACT

Objectives: This study is performed to find out the frequencies of different Acute myeloid leukemias (AML) subtypes in the local populationand to study the hematological parameters of the disease.

Study Design: Cross sectional descriptive study.

Setting and period: All patients being diagnosed as AML in Rehman Medical Institute Peshawar laboratory from January 2006 to September 2018.

Materials and Methods: It was a retrospective descriptive cross sectional study, carried out at RMI laboratory from January 2006 to September 2018. All the diagnosed cases of AML were included in the study and data was retrieved from the hospital records. A total of 83 newly diagnosed cases of AML of both gender and all ages were included in the study. Patients with history of any other hematological disorder such as myeloproliferative diseases, myelodysplasia and CML were excluded from the study.

Results: A total of 83 patients diagnosed as AML from January 2006 to September 2018 were included in the study.Out of them 48 were males and 35 were females, gender of one patient was not available in the archives. The most frequent acute myeloid leukemia came out to be AML M2, followed by M1 and then M4 with percentages of 34%, 15.7% and 14.5%. In the total 29 cases diagnosed as AML M2, 16 were males and 13 were females. Out of the total 13 cases diagnosed as AML M1, 7 were males and 6 were females. Out of the total 12 cases diagnosed as AML M4, 6 were males and 6 were females. So there was no significant correlation between gender and the type of AML. Seventy nine percent of the cases were between the age of 11 and 50 years. So the correlation between age and AML was less than .005 that is highly significant.

Key words: Leishmania, Lympho-hemopoietic, clinicoepidemiological, immunophenotyping, Sysmex

INTRODUCTION:

Cancer is the leading cause of mortality and morbidity and is responsible for about 12% of the deaths worldwide.In developing countries it is a leading cause of the death and accounts 9.5% of all the mortalities and in developed countries it accounts for about 21% of all the deaths1.Hematological neoplasms such as lymphoma and leukemia are a serious health issue in South Asia, leukemia is the second common hematological cancer of males and in females it is the fourth common malignancy in Northern areas of Pakistan. It is also the fifth most common cancer among the males and females belonging to Karachi2,3.

Acute leukemia are classified according to FAB classification into AML or ALL4. AML belongs to heterogenous group of blood neoplasms which causes escalation and accumulation of immature precursors of hemopoitic cells in the blood and bone marrow5.There is an increase in incidence of AML with age, adults above the age of 65 are affected more as compared with children with a poor survival rate6. AML is divided into several subtypes according to FAB classification on the basis of morphology and cytochemical features7,8. And is also classified according to WHO classification based on biological characteristics and response to therapies9.

The data was collected from Rehman Medical Institute-laboratory archives from January 2006 to September 2018 during a duration of five months from October 2018 to February 2019.

To find out the frequencies of different types of AML in our population. Correlation between different types of AML with age and gender was also calculated by using Chi-square test.

All the cases of AML diagnosed in RMI lab from January 2006 to September 2018 were included in the study regardless of ethnicity, age and gender.

RATIONALE OF THE STUDY

The rationale of our study is to determine the frequency of different AML subtypes in our population, and to study which subtype is more prevalent in these patients and its relation with age and gender.

OBJECTIVES:

1. This study is performed to find out the frequencies of different AML subtypes in the population.
2. To study the hematological parameters of the disease.

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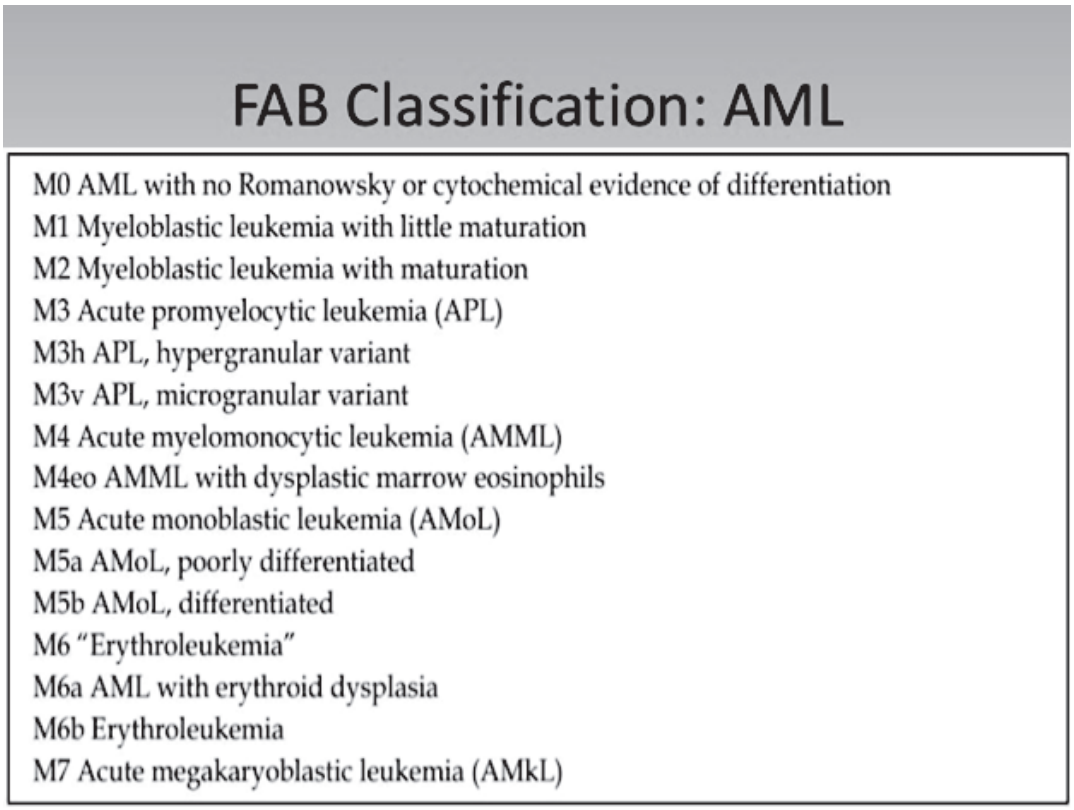

MATERIAL AND METHODS:

It is a retrospective descriptive cross sectional study, carried out at RMI laboratory from January 2006 to September 2018. All the diagnosed cases of AML were included in the study and data was retrieved from the hospital records after approval by Ethical Review Board of Rehman Medical Institute.

A total of 83 newly diagnosed cases of AML of both gender and allages were included in the study. Patients with history of any other hematological disorder such as myeloproliferative diseases, myelodysplasia and CML were excluded from the study.

INCLUSION CRITERIA: All the patients diagnosed with AML from January 2006 to September 2018 were included in the study.

EXCLUSION CRITERIA: Patients with hematological disorder other than AML were excluded from the study.

STUDY DESIGN: Cross sectional descriptive study.

SAMPLE SIZE: 83 patients

SAMPLING TECHNIQUE: Non probability convenience sampling

Hematological parameters were analyzed on Sysmex. Bone marrow biopsy specimen was retrieved from posterior superior iliac spinein adults and from upper part of tibia in children.6 to 8 smears were made in all cases, two of the smears were stained by Leishman stain and one each for PAS(periodic acid shiff) stain, MPO (myeloperoxidase), Sudan black stain and ANAE (alpha naphthyl acetate esterase). Immunophenotyping was carried out in some difficult cases.

The diagnosis was established on standard clinical procedure. All cases were reviewed by consultant Hematologist and Histopathologist and on the basis of morphology, cytochemical reactions and immunophenotypingAML was classified into different subtypes using FAB classification.

Data was analyzed using SPSS version 15. Frequencies and percentages were calculated for categorical variables and subtypes of AML. Correlation between different variables was calculated.

Results:

A total of 83 patients diagnosed as AML from January 2006 to September 2018 were included in the study.

Out of them 48 were males and 36 were females. The most frequent acute myeloid leukemia came out to be AML M2, followed by M1 and then M4 with percentages of 34%, 15.7% and 14.5%. In the total 29 cases diagnosed as AML M2, 16 were males and 13 were females. Out of the total 13 cases diagnosed as AML M1, 7 were males and 6 were females. Out of the total 12 cases diagnosed as AML M4, 6 were males and 6 were females. So there was no significant correlation between gender and the type of AML. Most of the cases were between the age of 11 and 50 years. So the correlation between age and AML was less than .005 that is highly significant.

Table number: 1 Age in years

	Frequency	Percent	Valid Percent	Cumulative Percent
1-10	7	8.4	8.4	8.4
11-20	16	19.3	19.3	27.7
21-30	17	20.5	20.5	48.2
31-40	12	14.5	14.5	62.7
41-50	14	16.9	16.9	79.5
51-60	7	8.4	8.4	88.0
61-70	6	7.2	7.2	95.2
71-80	4	4.8	4.8	100.0
Total	83	100.0	100.0	

Table number: 2 Gender of patients

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	48	57.8	57.8	57.8
	female	35	42.2	42.7	100.0
	Total	83	100.0	100.0	
Total		83	100.0		

Table number: 3 AML Subtypes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid					
	AML M0	8	9.6	9.6	9.6
	AML M1	13	15.7	15.7	25.3
	AML M2	29	34.9	34.9	60.2
	AML M3	9	10.8	10.8	71.1
	AML M4	12	14.5	14.5	85.5
	AML M5	6	7.2	7.2	92.8
	AML M6	5	6.0	6.0	98.8
	AML M7	1	1.2	1.2	100.0
	Total	83	100.0	100.0	

Table number:4 Cross-tabulation between Age and Subtype of AML

		AML type								Total
		AML M0	AML M1	AML M2	AML M3	AML M4	AML M5	AML M6	AML M7	AML M0
Age in year	1-10	0	1	3	1	1	0	0	0	6
	11-20	1	2	9	2	0	0	1	1	0	16
	21-30	0	5	5	2	2	3	0	0	0	17
	31-40	0	2	3	1	3	2	1	0	0	12
	41-50	1	0	5	2	4	1	1	0	0	14
	51-60	4	1	1	1	0	0	0	0	0	7
	61-70	1	0	2	0	1	0	2	0	0	6
	71-80	0	2	1	0	1	0	0	0	0	4
		0	0	0	0	0	0	0	0	1	1
Total		7	13	29	9	12	6	5	1	1	83

Table number: 5 Correlation between age and type of AML using Chi-Square Tests
Gender * AML type Crosstabulation

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi- Square	147.693(a)	64	.000
Likelihood Ratio	71.697	64	.238
N of Valid Cases	83		

Chi-Square Tests
79 cells (97.5%) have expected count less than 5. The minimum expected count is .01.

Table number:6 AML type Cross-tabulation between gender and type of AML
Count

		AML type								Total
		AML M0	AML M1	AML M2	AML M3	AML M4	AML M5	AML M6	AML M7	AML M0
gender	male	7	7	16	4	6	3	3	1	47
	female	0	6	13	5	6	3	2	1	36
Total		7	13	29	9	12	6	5	1	83

Table number 7Correlation between gender and type of AML using Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.094(a)	7	.419
Likelihood Ratio	10.029	7	.187
N of Valid Cases	83		

9 cells (56.3%) have expected count less than 5. The minimum expected count is .43.

DISCUSSION:-

Although the WHO classification of AML was published in 1997 but most of the laboratories in Pakistan including most tertiary care hospitals such as Rehman Medical Institute still follow the FAB classification of AML.

A study carried out in Hayatabad Medical Complex ,Peshawar including 680 samples of all types of acute leukemias both ALL (Acute lymphoblastic leukemia) and AML (Acute Myeloblastic leukemia) the most common subtype of AML came out to be AML M2 followed by AML M3 and AML M5 . Which is comparable to our study as the most common subtype in our study was AML M2.10

Another study done at IRNUM Peshawar in 2001 included 60 leukemia patients. AML M1 was the most common subtype followed by AML M2 which is exactly in contrast to the statistics in our study.11

Another study conducted at Department of Oncology Services Hospital Lahore included 113 patients, the peak incidence of AML in this study was between 31 and 40 years of age, which is comparable to our study where most of the cases were between 21 and 40 years of age. AML was slightly more common in males as compared to females in the same study, which is same as our study.12

Another study done at PAF Hospital Mianwali included a total 22 patients of AML and the median age at diagnosis was 41 years with male to females ratio of 1.4. The most common subtype in this study was AML M4 followed by AML M2.13, 14

According to a study done in Iran in 2014 the male to female ratio was 1.3 and the most common subtype was AML M2 followed by AML M3 which was consistent with our study. 15

A study conducted in China in 2009 by Tong Hetal included 192 AML patients, showed the most frequent subtype to be AML M2 (71 out of 192 i.e; 36.9%) followed by AML M4 (36 out of 192 i.e; 18.75%). So, the most common subtype was consistent with our findings.16

According to a study done in India in 2002, the incidence of AML M2 was highest in Mumbai. While in Pune the most common subtype was AML M4 and in Delhi the most common subtype was AML M2, which is consistent with our study. 17, 18, 19

Based on another study carried and in Sudan from 2014 to 2016 including 140 patients, male to female ratio was 1.1 with mean age of 33 years. Most common AML FAB subtype was AML M3 that is 29.3% followed by M2 i.e; 19.3% M4 15%, Mo 12.9% and M1 10% this study was slightly in contest to our study in terms of prevalent subtype and male female ratio. 20

A study conducted in Brazil in August 2005 to May 2009 including a total of 70 cases of AML, revealed no statistically significant difference in relation to gender. Most common subtype was AML M2 (18/37-48.6%) followed by Mo /M1 (10/37-27%). This study is exactly in accordance with our study. 21

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