VOLUME-6 | ISSUE-1 | JANUARY-2017 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 78.46

INCIDENCE OF ACUTE AND CHRONIC FORMS OF LEUKEMIA IN NAVI MUMBAI

Pathology

KEYWORDS: Leukemia , Myeloid, Incidence

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ABSTRACT

The prevalence of leukemia is known to vary throughout India with differences in geographic, age and trend patterns for different leukemia subtypes. So, an attempt was made to find out geographic pattern of leukemia and its distribution throughout the Navi Mumbai. It was a retrospective study of patients carried out in a period of 2 years from January ,2014 to December ,2015 and diagnosis was based on hematological parameters, cytochemistry and peripheral blood smear for morphology. In this study, commonest leukemia was chronic myeloid leukemia (CML) with male preponderance and a Male: Female ratio of 1.4:1 . Low grade fever, progressive pallor and generalized body aches were the commonest symptoms.

Introduction

Leukemias are defined as diseases in which abnormal proliferation of haematopoetic cells cause progressively increasing infiltration of bone marrow, although in certain forms the lymphatic tissues are particularly affected.[1] Leukemias demonstrate extra-ordinary biological, morphological and clinical heterogenecity.[2] High incidence of subtypes of leukemia in males was due to more exposed to occupational and environmental carcinogens .[3,4] Leukemias are the 10th most common cancer in men and 12th most common in women and constitute 3% of the global cancer burden.[5] The developing countries have greater burden of cancer including hematological malignancies due to population growth, aging and urbanization, changing dietary habits, better control of infections, and increasing tobacco consumption. [6] In India, lympho-haematopoietic malignancies constitute 9.5% of all cancers in men and 5.5% in women.[7] Myeloid leukemias predominate in India while lymphoid leukemias dominate in western world mainly because of higher incidence of chronic lymphatic leukemia.[8] It is further challenging to take these findings in detecting different types of leukemia earlier and ideally to prevent the disease. This is a fundamental step to estimate the burden of blood cancer in Navi Mumbai and to understand how the occurrence of this disease varies according to prevalence, risk factors, laboratory parameters and clinical features of this hematological malignancy.

Materials and Methods

Present study was carried out in the department of pathology, MGM Hospital, Kamothe for a period of 2 years from January 2014 to December, 2015. A total of patients with acute and chronic leukemia reported during the study period were included in the study. F.A.B. (French, American, British) classification was used for AML which subdivides into eight types M0, M1, M2, M3, M4, M5, M6, M7 and ALL into three subtypes as L1, L2, L3.[9,10,11] The study is retrospective and data collected from records maintained in department of Pathology, MGM Hospital, Kamothe. The whole blood samples of patients were taken with informed consent for hematological analysis. Percentage of blast cell, red blood cell indices, white blood cell indices, number of platelets and the amount of hemoglobin was determined according to standard laboratory procedures. Slides were prepared with PBF (Peripheral Blood Film) by using 'Leishman stain' and 'Field's stain' to find out the blast cells morphology in peripheral blood sample of all patients of blood cancer. Diagnosis of leukemia was done by 20% blast criteria and then 'MPO'(Myeloperoxidase) and 'PAS'(Periodic acid–Schiff) stains were used.

RESULTS

Total patients diagnosed as leukaemia were further subjected to analysis according to their different morphology i.e. Chronic Myeloid Leukemia (CML), Acute Myeloid Leukemia (AML), Acute Lymphocytic Leukemia (ALL) and Chronic Lymphocytic Leukemia (CLL); with other relevant parameters.

GENDER	CML	AML	ALL	CLL
MALE	32	16	08	03
FEMALES	22	10	06	03
TOTAL	54	26	14	06

Table1: Percentage frequency of various types of leukemia patients diagnosed during the period of study.

Table 1 shows that CML was the commonest leukemia which is accounted for 54% cases followed by AML (26%) , ALL (14%), and CLL (06%). It was also observed that, out of total 100 cases, 59 were male and 41 were females and Male: Female ratio was 1.4:1 which indicates male predominance in all types of leukemia.

	CML	AML	ALL	CLL								
Sex/ Age	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL	M	F	TOTAL
1-15	00	00	00	00	00	00	06	04	10	00	00	00
16-30	06	10	22	09	01	10	01	01	02	00	00	00
31-45	08	04	12	05	03	08	00	01	01	00	00	00
46-60	12	04	10	02	05	07	01	00	01	02	02	04
61-75	02	02	04	00	01	01	00	00	00	01	01	02
>75	04	02	06	00	00	00	00	00	00	00	00	00
Total	32	22	54	16	10	26	08	06	14	03	03	06
M:F Ratio	1.4:1	1.6:1	1.3:1	1:1								

Table 2: Age and Sex distribution of leukemia amongst study population

It was observed from table 2 that age groups found to be most vulnerable for the various leukemias, which was as follows; CML was commonest in age group of 31-75 years, AML were between 16-60 years of age group, ALL were distributed from the age group of 1-45 years while CLL were more common in the age group of 46-75 years.

PARAMETERS	AML	ALL	CML	CLL
Median age in years	45	38	58	64
Age Range in years	16-60	1-45	31-75	46-75
Mean Hb in gram/dl	7.6	7.4	8.3	9.8
Mean WBC x 103/uL	2629	796	3546	212
Mean Platelet count x 103 /uL	9.36	8.54	14.4	4.34
Median Blast Cell (%)	55	53.4	4.71	2.3

Table 3: Different hematological parameters in leukemia

All patients were studied for laboratory parameters like hemoglobin concentration, leukocyte count and platelet count (Table-3).Thus mean hemoglobin in CML was 8.3g/dl, mean total leukocyte count was, 3546X103/uL in CML ,mean platelets count was 14.4X103/uL in CML and the leukemic blasts in the peripheral blood was highest in the AML with a median blast cell count 55%.

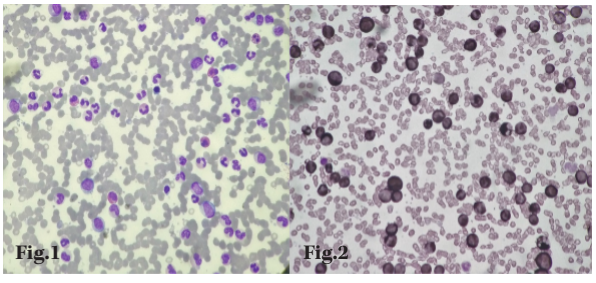
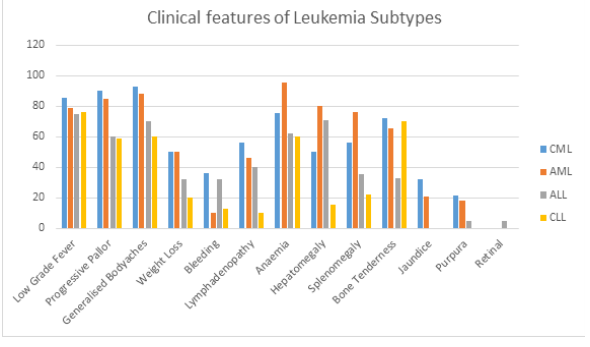


Figure 1 – Leishman stain. 400x view. CML showing myeloid cell population in varying stages of maturation.

Figure 2 – Myeloperoxidase stain. 400x view; CML showing strong MPO positivity.

Clinical Features :



Majority of our patients presented with low grade fever, generalized body aches , progressive pallor and anemia with a mean value of 79.05%, 77.8%, 73.6% and 73.3% respectively.

Various factors play significant role in diagnosis of leukemia. Age of diagnosis helps in determining the type of leukemia. In the present study, it was found that ALL affects children primarily and AML affects adults while CML also affects in elder age and CLL is the disease of older people. Age was having significant effect on type of leukemia. The interaction of age with any other factor like gender or subtype of leukemia plays very significant role (Table-3)

Discussion

In the year of 1857, Virchow probably was the first to classify leukemia. On the pathologic distribution of tumor he distinguished splenic and lymphatic forms of leukemia.12 The incidence of leukemia has increased considerably and this rise is noticeable because of improved statistics, better case findings with novel technologies which lead to better diagnosis and treatment methods. The incidence of leukemia found to be varying from different geographical areas according to their life styles, economic conditions, and poverty rate.13 In present study, chronic myeloid leukemia (CML) was more common which was in concordance with the studies carried out by Vasavada et al.14, Kushawaha et al 15, Chatterji et al.16, Rani S et al.17, Shome et al 18 and Rathee et al 19. It was also observed that studies reported by Menzes and Malik20 and Verghese et al 21 vary from present study, which might be due to geographical variation. Due to the chronicity of CML, incidence and prevalence remains higher amongst all leukemias. It is likely that patients with CML are now being diagnosed earlier for several reasons including greater awareness of the disease among clinicians and the wide availability of cheap, accurate leucocyte and platelet measurements not performed in the past.

In our study, male predominance was seen, which is similar with most studies conducted in India and other countries.19,[22]

In the current study, commonest type of leukemia was CML followed by AML, ALL and CLL (Table - 1). Previous studies have reported more cases of myeloid leukaemia .17,18 Though, CLL is the most common form of leukemia affecting adults in western countries. Incidence of CLL is lower in India 23. In our study, chronic lymphoid leukemia (CLL) has lowest percentage of total leukemia cases.

CONCLUSION

Present study revealed that chronic leukemia was more prevalent than acute leukemia. The most common type of leukemia was CML followed by AML, ALL and CLL. Overall leukemia was more commonly seen in male patients. Age has significant effect on type of leukemia. ALL was more commonly observed in children whereas both CML and CLL were only observed in adults. The incidence of AML was higher in adults as compare to children .The majority of patients had lower hemoglobin, high leukocyte count and lower platelet count, low grade fever, progressive pallor, generalized weakness, anemia and bodyaches, lymphadenopathy, jaundice, purpura and retinal hemorrhages were most common characteristics in patients.

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VOLUME-6 | ISSUE-1 | JANUARY-2017 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 78.46

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