Original Research Article

Spectrum of leukemia at tertiary care hospital

Kalpana B Rathod[1], Deepak G Kulkarni[1],*, Leena Nakate[1]

[1]*Dept. of Pathology, B. J. Medical College, Pune, Maharashtra, India*

A R T I C L E   I N F O

A B S T R A C T

Introduction: Acute leukemia are characterized by clonal expansion of immature myeloid or lymphoid precursors (blasts). The blasts cells are known to replace the normal hematopoietic tissues and to invade other organs of the body as well. Anemia, hemorrhage and infections occurring due to bone marrow failure are the top three complications of acute leukemia & chronic leukemia.
Materials and Methods: In this study the various types of leukaemia distribution carried out at tertiary care Hospital among various ethnic groups, in terms of types, age, sex. This retrospective study over a five years period between January 2014 to December 2018, carried out in the department of Pathology, at tertiary care Hospital. Diagnosis was done with the help of peripheral blood count, peripheral blood smear and bone marrow examination for morphology along with cytochemistry study whenever required. FAB classification is followed in the present study.
Results: Different patterns of acute leukemia were reported, in the present study. According to haematological parameters, following cases of acute leukemia 128 cases (69.18%), & chronic leukemia of 55 cases (29.72 %) were reported. Also 47 cases (25.40%) & 8 cases (4.32%) were reported as CML & CLL respectively.
Conclusions: The present study showed that AML is more common than ALL. It is observed that ALL is more common ly seen in children. The incidence of AML is higher in adults in comparison to children and decreases towards older age.

1. Introduction

In worldwide malignant proliferation of haematopoietic cells constitutes major proportion of haematopoietic neoplasms. Leukaemia's classified into myeloid and lymphoid subtype.[1] For effective therapy typing of leukemia is necessary because of prognosis and survival rate are different for each type and sub- type.[2]

A cute leukaemia's are heterogeneous group of haematological malignancies and are characterized by clonal expansion of immature myeloid or lymphoid precursors (blasts). The blasts cells are known to replace the normal hematopoietic tissues and to invade other organs. The top three complications of acute leukemia are anaemia, hemorrhage and infections occurring due to bone marrow

failure.[3–5] . The most common childhood cancers are acute leukaemia's. The percentage of blasts should be more than 20% in the marrow or peripheral blood for diagnosing a cute leukemia, as per the WHO classification.[6]

Classification of Leukemia as of two types; acute and chronic. Acute leukaemia's are; acute myeloid leukemia (AML) and acute lymphoblastic leukemia (ALL). In childhood, most common type is ALL than AML. In Indianans all haematological malignancy the incidence of ALL and AML are 35% and 15% respectively. Classification of Chronic leukaemia's are chronic myeloid leukemia (CML) and chronic lymphocytic leukemia (CLL).[7,8]

Leukemia is 10th most common worldwide cancer with an incidence of 3,51,000 new cases (2.8%) and mortality of 2,57,000(3.4%) each year.[9] In childhood malignancy

* *Corresponding author.*
E-mail address: rkalpanaa11@rediffmail.com (D. G. Kulkarni).

Leukaemia is also the most common. It accounts for 30% of all cancers diagnosed in children under 15 years of age. [10–12]

In this study the prevalence of different types of leukaemia's along with age and gender distribution were studied.

2. Materials and Methods

The present study, retrospective analysis of leukaemia cases in respect to type, age, sex and ethnic groups was carried out over a period of 5 years (January2014 to December 2018), in the department of pathology at tertiary care teaching hospital. A cute/chronic leukaemia's was diagnosed in 185 total number of patients. Detailed medical history was taken and clinical examination carried out. Blood counts were performed on automated haematology analyser. All the haematological parameters were noted. Findings of peripheral blood and bone marrow aspiration were interpreted in respect to history and clinical examination. Whenever required special stain like myeloperoxidase (MPO), Periodic acid-Schiff (PAS) were done. According to WHO guideline diagnosis of acute leukemia was made in cases where blast percentage was ≥20% FAB classification of acute leukemia was applied for subtyping.

Data analysis: - data were analysed by using microsoft excel

3. Result

In the present study 185 cases of leukaemia's were diagnosed over a time period of 5 years (January2014 to December 2018). Out of the 185 cases, 128 cases (69.18%) were of acute leukaemia's and 55 cases (29.72%) were of chronic leukaemia's (Table 1).

Among the subtypes of leukaemia's, according to haematological parameters, 46 cases (24.86%), 60 cases (32.43%) these are the patient doesn't turn out for follow up, 24 cases (12.97%) and 47 cases (25.40%) & 8(4.32%) were reported as acute leukaemia, AML, ALL, CML, CLL respectively. The haematological diagnosis (by means of complete blood count (CBC) / peripheral blood smear (PBS) / bone marrow aspirates (BMA) using this done. (Table 2)

Acute myeloid leukemia (AML) and acute lymphoblastic leukemia (ALL) were found in 60(32.43 %) and 24(12.97%) of the patients respectively. Of chronic type leukemia, 47(25.40%) patients had chronic myeloid leukemia (CML) and only 8 (4.32%) had chronic lymphocytic leukemia (CLL). (Table 2).

In our study out of 185 cases overall male preponderance was found with a percentage of 104 (56.21 %) of total cases and 81 (43.78%) in females. The overall male: female ratio was 1.28: 1. (Table 3).

Majority of the patients belonged to age groups 31-40 yrs. (22.16%). Among the subtypes, most common age group affected by ALL was of 0-10 yrs. in which 10 cases

seen. In AML and CML common age group involved was 31-40 yrs. in which 18 and 11 cases seen respectively. I n CLL common age group affected was 61 - 70 yrs. in which 5 cases reported. (Table 4).

All AML cases (60) are shows positivity for special stained like Myeloperoxidase & Sudan black B.& negative for Periodic acid sniff, whereas all ALL cases (24) are positive for PAS & negative for MPO & SBB.

4. Discussion

Evelution of morphological cellular details and phenotypic or genotypic pattern required for diagnosis of haematological malignancies. [13,14] The neoplastic proliferation of haemopoietic and lymphoid cells resulting into leukaemia. Worldwide, it is one of leading causes of death, especially in paediatrics age group. Acute leukemia is more common than chronic leukemia observed in our study. It is not similar to report from western literature where chronic leukemia is more common. But it is comparable with reports from D ' Costa GG et al.[15], Kulshrestha R et al[16], Modak H et al[17], Chen et al[18]

Among the subtypes of leukemia in this study, AML is the most common type of leukemia. It is comparable with studies by Modak H et al[17] and Chen et al[18] but other study like D'Costa et al (15) and Kulshrestha R et al[16] reported maximum number cases of CML. Is comparable with most of studies in India, eastern and western countries, AML is more common in adult. In this study male predominance is seen similar with most studies mentioned[15,17,19–23]. In this study CLL is rare only 8 cases (4.32%) were seen. which is comparable with D Costa GG et al, Kulshrestha R et al and Chen et al[15,16,18] but CLL is most common adult leukaemia in western countries. In children most prevalent is ALL subtype. i.e. 24 cases (12.97%).

In our study we found, 6 9.18% of patients had acute leukemia while 29.72 % had chronic leukemia. Which is Similar to the findings of other studies. Nasim N et al found 80% acute leukemic cases and Humayan et al showed 90% of acute type in their study.[24,25] This similar observation (ALL>AML) was also observed by Rego MF et al.[26]

Overall male preponderance was found in our study with a percentage of 56.21% in males and 43.78% in females (ratio ≈ 1.28 :1). Similar results of gender distribution have been reported in different studies. Harani MS et al, Jmili NB et al, Ullah K, and Salkar AB also found higher male to female ratio 1.5:1, 1.2:1, 1.7: 1 and 2:1 respectively.[2,27–29] Overall, there were 66% males and 34% females with male to female ratio being 1.94:1 as seen in study conducted by Gupta R et al.[30] Hasanbegovic E also observed similar male preponderance.[31] In ALL and AML cases, male patients were more than female. However female predominance was seen in CML cases in our study.

All AML cases (60) are shows positivity for Myeloperoxidase & Sudan black B. special stained and negative for

Table 1: Table showing percentage of type of leukemia

Type of leukaemia's	Number of cases	Percentage
Acute Leukemia	128	69.18%
Chronic Leukemia	55	29.72%

Table 2: Table showing type of Distribution of Leukemia according FAB classification.

Type of Leukemia	Number of cases
Acute Leukemia	46(24.86%)
AML	60(32.43%)
ALL	24(12.97%)
CML	47(25.40%)
CLL	8(4.32%)
Total	185

Table 3: Table showing Sex wise distribution

Male	104(56.21%)
Female	81(43.78%)
	185

Table 4: Table showing Age & Type of leukemia

Age	Acute Leukemia	AML	ALL	CML	CLL	Total
0-10 yrs.	9	8	10	1	0	28 (15.13%)
11-20 yrs.	10	2	6	4	0	22 (11.89%)
21-30 yrs.	12	5	3	3	0	23 (12.43%)
31-40 yrs.	7	18	5	11	0	41 (22.16%)
41-50 yrs.	5	9	0	7	1	22 (11.89%)
51-60 yrs.	3	9	0	8	1	21(11.35%)
61-70yrs	0	5	0	9	5	19 (10.27%)
>70 yrs.	0	4	0		1	9 (4.86%)
	46	60	24	47	8	185

Table 5:

Types of Leukemia	Our study	Modak H et al	Chen et al	D'Costa et al	Kulshrestha R et al
AML	32.43%	More cases reported like our study	More cases reported like our study	less	less
ALL	12.97%	Similar	similar	similar	similar
CML	25.40%	less	less	More cases reported	More cases reported
CLL	4.32%	less	less	Cases reported like our study	Cases reported like our study

Periodic acid s niff stained, whereas all ALL cases (24) are positive for PAS & negative for MPO & SBB.

The results of the present study were almost similar to the local studies but on comparison with western studies, the results are more manifested. These marked results can be attributed to the late presentation as the degree of anaemia; leucocytosis and thrombocytopenia are directly proportional to severity of bone-marrow failure.[32]

Diagnosis of primary haematological malignancies has a multipara metric approach which includes evaluation of morphological cellular details and phenotypic and genotypic patterns

5. Conclusion

Early recognition of signs and symptoms which are more suspicious for leukemia, are helpful in early diagnosis of haematological malignancies. This study concludes that acute leukaemia's were more common in this region among both children and adults. Among the children ALL is the most common leukaemia and among the adults A ML followed by CML is most common. Leukaemia's is predominantly found in males in this part of the country.

6. Source of funding

None.

7. Conflict of interest

None.

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Author biography

Kalpana B Rathod Assistant Professor

Deepak G Kulkarni Professor

Leena Nakate HOD and Professor