



PREVALENCE OF LEUKEMIA IN TERTIARY CARE HOSPITALS

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*Corresponding Author**ABSTRACT****INTRODUCTION:** Leukemias are neoplastic proliferations of haematopoietic cells and form a major proportion of haematopoietic neoplasms. It is a malignant progression disease in which the bone marrow and other blood-forming organs produce increased number of immature or abnormal leucocytes.**AIMS:** To study the various clinical presentation of Leukemia for the first time to Hospital located in rural region.**METHODS:** It was a retrospective study conducted in the Department of Pathology over a three years period between Jan 2016 and Dec 2018 presenting for the first time for leukemia.**RESULTS:** In this study, commonest leukemia was CML followed by AML, ALL and then CLL. Out of total 52 cases studied 31 were male and 21 were females with Male: Female ratio is 1.4:1. Most common age group affected is 40-50 years.**CONCLUSION:** This study highlights the various clinical presentation and its significance. Early diagnosis would provide better survival rates.**KEYWORDS :** Haematopoietic Proliferation, Malignant Progression**INTRODUCTION**

Leukemia is a neoplasm that present with widespread involvement of the bone marrow and (usually, but not always) the peripheral blood¹. It is a malignant progression disease in which the bone marrow and other blood-forming organs produce increased number of immature or abnormal leucocytes. Malignant proliferation of haematopoietic cells (leukemia) constitutes major proportion of haematopoietic neoplasms worldwide. These suppresses the production of normal blood cells. Leukemias are defined as diseases in which abnormal proliferation of haematopoietic cells cause progressively increasing infiltration of bone marrow, although in certain forms the lymphatic tissues are particularly affected. They form a significant percentage of haematological disorders and affects individuals of all age groups throughout the world, but the incidence of disease and the frequency of various morphological types and sub-types have been found to be differing in different countries². Leukemias demonstrate extraordinary biological, morphological and clinical heterogeneity³. Typing of leukemia is essential for effective therapy because prognosis and survival rate are different for each type and sub-type¹. Leukemia are of two types; acute and chronic. Acute leukemias are; acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML). In childhood, ALL is most common type than AML^{5,6}. In India, the incidence of ALL and AML are 35% and 15% of all hematological malignancies respectively⁴. Chronic leukemias are classified into chronic myeloid leukemia (CML) and chronic lymphocytic leukemia (CLL). The purpose of classification of leukemias is to organise knowledge into manageable forms so that biological entities can be recognised and treated efficiently.

The estimated new cases of leukemia diagnosed in 2018 worldwide is 4,37,033(7). The developed countries has an increased prevalence compared to that of the developing countries.

AIM:

To estimate the prevalence of leukemia being presented in tertiary care hospital. This study is done as there is a growing incidence in the occurrence of leukemia currently and to compare the results of the age at which people are more prone to leukemia and the sex that's is comparatively more prone and also to compare the results of the type of leukemia that's more prone to occur with the studies conducted previously.

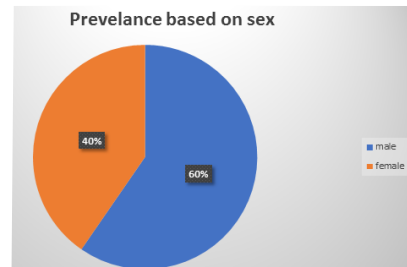
METHODOLOGY:

It was a retrospective study conducted in the Department of Pathology over a three years period between January 2016 and December 2018. Leukaemia was diagnosed on the basis of complete blood count, peripheral blood smear and bone marrow examination for morphology along with cytochemistry study whenever required. A total of 52 cases were presented first time to the hospital within the range of these three years. Diagnosis was made on findings of peripheral blood count (i.e. Haemoglobin, Total leucocyte count and Platelet count) which was

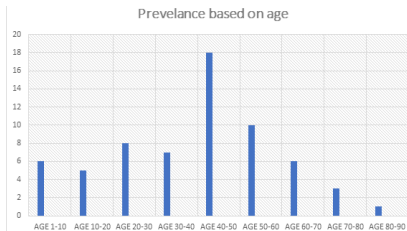
done by automated cell counter; peripheral blood smear and bone marrow aspiration smear stained by Leishman stain. Leishman stain was poured on air dried unfixed smears for a period of 5-7 minutes, then added twice quantity of buffered distilled water for next 10 minutes. Cytochemistry studies (like myeloperoxidase (MPO), Periodic acid schiff stain (PAS), Sudan black B (SBB) and Non-specific esterase) were done in all prospective cases to differentiate myeloid and lymphoid leukemia.¹¹

RESULTS:

The incidence of leukemia found to be varying from different geographical areas according to their life styles, economic conditions, and poverty rate.¹



Out of the total 52 cases patients, 31 were males and 21 were females. Rates are generally higher in males than in females with an overall male to female ratio 1.4:1.

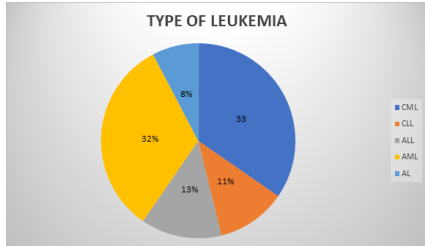


In children, Acute lymphoblastic leukemia was the main subtype in all studied countries in both sexes, and characterised by a bimodal age-specific pattern. The most prevalent age group affected is from 40-50 years old. This is followed by the age groups 50-60. The prevalence appears to decrease after 60 years per every decade.

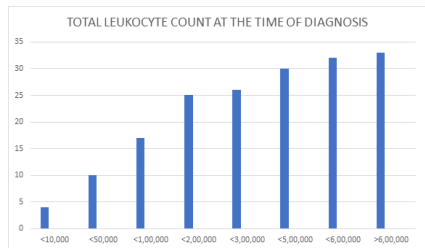
Age/sex	AML			ALL			AL			CML			CLL		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
1-15	0	0	0	1	2	3	0	0	0	0	0	0	0	0	0
16-30	1	0	1	0	0	0	2	0	2	5	1	6	1	0	1
31-45	1	5	6	1	1	2	1	1	2	3	0	3	0	0	0
46-60	2	3	5	1	1	2	0	1	1	5	1	6	1	0	1

61-75	1	2	3	0	0	0	1	0	1	1	2	3	0	1	1
75	1	1	2	0	0	0	0	0	0	0	0	0	1	0	1
Subtotal	6	11	17	3	04	07	04	02	6	14	4	18	3	1	4
Total	17			07			06			18			04		

Chronic myeloid leukemia is unique in combining the need for an expensive longterm therapy (daily TKIs) that results in clinical elimination of the disease only with continued therapy in most instances making it more of chronic disease. Due to chronicity of CML incidence and prevalence remains higher amongst all leukemias². The prevalence of myeloid type is higher in adults.



In this study, commonest leukemia was chronic myeloid leukemia (CML), Acute Myeloid leukemia (AML) followed by acute Lymphoid leukemia (ALL) and then acute leukaemia(AL) and chronic lymphoid leukemia (CLL).



Presenting signs and symptoms of the patients at the hospital:

PRESENTING SYMPTOM	NO.OF.PATIENTS
Fever for evaluation	18
Generalised weakness with vague symptoms	7
Fever with Shock	1
CVA with left hemiparesis	1
Intra trochantericfracture	
Dysphagia,throat pain,rash in both hands	1
Breathlessness	2
Pulmonary edema ,CCF,Hypertension	1
Acute pulmonary edema	1
Broncho pneumonia	1
Panniculitis	1
Anemia for evaluation	1
Deep vein thrombosis	1
Peticeal rashes	1
Irregular periods and vomiting	1
Generalised lymphadenopathy	1
Generalised lymphadenopathy,oral ulcer	1
Cystitis	1
Left lower abdomen colic pain & ureteric colic	1
Gum bleeding ,Pedal edema and fever	1
Epigastric fullness ,loss of weight and loss of appetite	1
Haematemesis ,abdominal pain	1
Acute gastritis with cervical lymphadenopathy	1
Acute gastroenteritis	1
Upper gastrointestinal bleed, anaemia for evaluation	1
Abdominal pain & blood stained sputum	1
Anaemia for evaluation	1
Fever ,dysphagia, breathlessness	1
Abdominal distension	1

DISCUSSION:

In India, annually >10,000 cases of childhood leukemia have been reported. ALL accounted for 60 to 85% of all childhood leukemias. Incidence of leukemia in Indian pediatric population was reported as 34%, of which 25% was ALL. In spite of the existence of national registry for child-hood leukemia, challenges such as under-reporting due to lack of awareness, under-diagnosis, and insufficient infrastructure still exist, which are contributing to the paucity of accurate data, delay in recognizing the disease on time and a late referral. This can place the child in a high risk category. Hence, improved awareness among the physicians, health care providers and general public is essential.

According to the study, CML decreased significantly among men and women by around 1% per year. CLL also declined significantly by around 1% per year among men and 0.6% per year among women. In contrast, ALL rates increased significantly by around 2.5% per year among women and non-significantly by 0.7% per year among men. AML trends were not significant in either sex.

According to a research in Lahore shows that the most common presenting symptoms were fatigue (91%), fever (86%) and bleeding from different sites (40%). The less common symptoms were generalized weakness (37%), weight loss (29%), productive cough (11%) and anorexia and vomiting (4%)⁸.

Myeloid leukemias predominate in India while lymphoid leukemias dominate in western world mainly because of higher incidence of chronic lymphatic leukemia.³ The survival rate of chronic lymphoblastic leukemia is better compared to the rest with a rate 83.2 %. While that of Acute lymphoblasticleukemia is 68.2 %,Chronic myelogenous leukemia is 66.9 %, Acute myelogenous leukemia is 26.9%.

chronic magnesium and zine deficiency seems to be associated with the development of ALL and malignant lymphoma in a group of patients.¹⁶

Global incidence and prevalence of acute lymphoblastic leukemia: A 10-year forecast states that in 2020, we estimate ALL incidences to range from 0.4 to 2 per 100,000 in Asia-Pacific and South American countries, respectively; while prevalence will range from 0.37 to 1.6 per 100,000 in these regions. In terms of case burden, when accounting for the approximate 10% of the world's population not covered by the 45 countries in which we forecast incident and prevalent cases, there were a total of 53,000 cases in 2016 worldwide at the 11th International Conference on Hematology & Hematological Oncology.⁹

Leukemia incidence varies considerably by geography and subtype, according to an analysis of World Health Organization cancer databases.

Incidence also is generally higher in males, with a global male to female ratio of 1.4. For men, the highest regional leukemia rate – estimated at 11.3 per 100,000 population for 2012 – was found in Australia and New Zealand, with northern America (the United States and Canada) next at 10.5 per 100,000. Australia/New Zealand and northern America had the highest rate for women at 7.2 per 100,000, followed by western Europe and northern Europe at 6.0 per 100,000, reported Adalberto Miranda-Filho, PhD, of the WHO's International Agency for Research on Cancer in Lyon, France, and his associates.¹⁰

The lowest regional rates for women were found in western Africa (1.2 per 100,000), middle Africa (1.8), and Micronesia/Polynesia (2.1). For men, leukemia incidence was lowest in western Africa (1.4 per 100,000), middle Africa (2.6), and south-central Asia (3.4), according to data from the WHO's GLOBOCAN database. The report was published in The Lancet Haematology.¹⁰

Estimates for leukemia subtypes in 2003-2007 – calculated for 54 countries, not regions – also showed a great deal of variation. For acute lymphoblastic leukemia, Ecuador had the highest rates for both males (2.8 per 100,000) and females (3.3), with high rates seen in Costa Rica, Columbia, and Cyprus. Rates in the United States were near the top: 2.1 for males and 1.6 for females. Rates were lowest for men in Jamaica (0.4) and Serbia (0.6) and for women in India (0.5) and Serbia and Cuba (0.6), Dr. Miranda-Filho and his associates said.¹⁰

The incidence and clinical presentation of many haematological cancers in India is relatively lower and differs from that seen in western world due to health awareness and availability of health care delivery system.^{14,15}

The prevalence of acute leukemias overall exceed that of chronic leukemia which concurs with the studies of prevalence conducted in other parts of India and Pakistan.^{17,18}

CONCLUSION:

This study proves that many case presentations of leukemia is unique and early recognition of the signs and symptoms are essential for better patient care and diagnosing at earlier stages for better survival rates.

REFERENCES:

1. Robbins textbook of Pathology 9th edition Vinay Kumar,
2. Incidence of acute and chronic leukemias in rural area at tertiary care teaching hospital: a five years of study- Jaya Bhaskar Baviskar, Indian Journal of Pathology and Oncology, October-December 2016;3(4):710-713
3. Pilot Study of an Integrative New Tool for Studying Clinical Outcome Discrimination in Acute Leukemia Maria José Gacha-Garay1, Andrés Felipe Niño-Joya1, Natalia I. Bolaños2, Lina Abenoza3, Guillermo Quintero3, Humberto Ibarra4, John M. Gonzalez2, Verónica Akle5 and Zayra V. Garavito-Aguilar1* Front. Oncol., 09 April 2019
4. Spectrum of acute and chronic leukemia at a tertiary care hospital, Haryana, India Gajender Singh, Padam Parmar, Sant Prakash Kataria, Sunita Singh, Rajeev Sen International Journal of Research in Medical Sciences Singh G et al. Int J Res Med Sci. 2016 Apr;4(4):1115-1118
5. American Cancer Society › detection-diagnosis-staging › how-classified Childhood Leukemia Subtypes -American Cancer Society
6. National Cancer Institute (.gov) › patient › child-all-treatment-pdq Childhood Acute Lymphoblastic Leukemia Treatment (PDQ ...
7. Cancer Stat Facts: Leukemia National Cancer Institute (.gov) › seer › statfacts › html › leuks
8. Investigation on the prevalence of leukaemia at a tertiary care hospital, Lahore Nighat nasim, Kalimuddin malik, Nauman a. Malik shaista mobeen, Saud awan and Naghmana mazhar Department of Pathology, PGMI / Lahore general hospital, Lahore
9. 11th International Conference on Hematology & Hematological Oncology November 08-09, 2017 | Las Vegas, USA
10. From the lancet haematology, A global snapshot of leukemia incidence March 13, 2018
11. Practical Haematology Dacie and Lewis, 10th edition, Year 2006, page 65, 318-326.
12. Causar J B, The haematopoietic- lymphoid Neoplasms chapter 80. In Wintrob's clinical haematology. Lee G.R. et al, Baltimore: Williams and Wilkins 1998.
13. Kumar L, Kumari M, Kumar S, Kochupillai V, Singh R, Clinical and laboratory features at diagnosis in 437 patients with chronic myelogenous leukemia: An experience at tertiary care centre. In: Kumar L(ed). Progress in hematologic oncology, New York: The advanced research foundation 2003:83-98.
14. Kulshreshta R, Sah SP- Pattern of occurrence of leukemia at a teaching Hospital in Eastern region of Nepal- A posted the SEER web site, 2010 six year study J Nepal Med Assoc 2009;48(173):35-40.
15. Chronic magnesium and zinc deficiency seems to be associated with the development of ALL and malignant lymphoma in a group of patients.(Guurses Slahin, Ulya Ertem, Feride Duru, Dilek Birgen & Nazmiye Yuuksekk)
16. Nasim N, Malik K, Malik NK, Mobeen S, Awan S, Mazhar M. Investigation on the prevalence of leukemia at a tertiary care hospital, Lahore. Biomedica. 2013;29:19-22.
17. Humayun M, Khan SA, Muhammad W. Investigation on the prevalence of leukemia in North West Frontier Province of Pakistan. TJC. 2005;35(3):119-22