

# TYPES AND SUBTYPES OF LEUKAEMIA IN NEWLY DIAGNOSED PATIENTS ADMITTED IN THE DEPARTMENT OF CHILD HEALTH IN A TERTIARY CARE HOSPITAL

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## ABSTRACT

**Objective:** To determine the frequency of types and subtypes of leukaemia in newly diagnosed patients admitted in the department of child health of a Tertiary Care Hospital.

**Material and Methods:** This was a cross-sectional descriptive study, conducted in the Department of Child Health, Khyber Teaching Hospital Peshawar, Pakistan, from June 2016 to December 2017. A total of 50 newly diagnosed cases of acute leukaemia (subtypes of ALL and AML) were selected through non randomised convenient sampling. Patients less than 15 years with clinical features suggestive of Acute Leukaemia were included while patients more than 15 years and under treatment chemotherapy/ radiotherapy were excluded. Common clinical features were noted along with hematological parameters.

**Results:** Thirty one were male and 15 were female children who presented with acute lymphoblastic leukaemia and 04% patients were of acute myeloid leukaemia with two patients male and 2 female. Ninety two percent cases presented with acute lymphoblastic leukaemia and 8 cases presented with acute myeloid leukaemia. On bone marrow examination ALL L1 was predominant type. There were 44 cases of ALL L1, 2 cases of ALL L2 and no cases of ALL L3 noted. In acute myeloid leukaemia 2 cases were that of AML type M2 and two of AML M4 and no cases observed in types M0, M3 and M5.

**Conclusion:** Acute lymphoblastic leukaemia was the most common type of leukaemia followed by myelogenous leukaemia, males were much more affected than females.

**Key Words:** Acute, leukaemia, lymphoblastic, Myelogenous leukaemia.

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## INTRODUCTION

Acute lymphoblastic leukaemia (ALL) is a malignant proliferation of lymphoid cells blocked at an early stage of differentiation<sup>1</sup>. Acute leukemia comprises a heterogeneous group of disorders<sup>2,3</sup>. Recognition of this heterogeneity is based largely on morphology<sup>4</sup>. The French American British (FAB) Cooperative working group, define three categories of lymphoblasts. L1 lym-

phoblasts are small cells characterized by high nucleus to cytoplasm ratio. The Pale blue cytoplasm is scanty, the cells have indistinct nucleoli and nuclear membrane that vary from round to clefted. L2 lymphoblast are large with a lower nucleus to cytoplasm ratio they may be indistinguishable from M1 variant of myeloid leukaemia. The differentiation is made by MPO staining. L3 lymphoblasts are a heterogenous group of cells identical to Burkitt like Lymphoma<sup>1</sup>. Similarly depending upon the morphological characteristics Acute myeloid leukaemia is classified from M0 to M5<sup>7</sup>. A new WHO classification based on genetic, immunophenotypic, biological, and clinical features to define specific disease entities<sup>6,7</sup>. But these facilities are not readily available for all patients in our setups.

Acute lymphocytic leukemia (ALL) is approximately 4-5 times more common than AML, accounting for

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approximately 80% of all childhood leukemia diagnoses. Conversely, AML comprises only 15% to 20% of cases in patients less than 15 years<sup>8</sup>. Factors associated with development of leukemias are hereditary disorders with susceptibility to chromosomal breakage exposure to radiation<sup>9,10</sup>.

The clinical presentation of acute leukaemia is variable and it makes diagnosis difficult for the treatment<sup>11</sup>. Bone marrow biopsy is the only way to reach at the correct diagnosis of leukemias<sup>12</sup>. Bone marrow examination is a useful and cost-effective Diagnostic procedure in haematological practice for the diagnosis of both neoplastic and non-neoplastic haematological diseases<sup>13</sup>. Besides this bone marrow is a common tool for Staging of various tumors. Cytogenetics studies, flow cytometry and immunohistochemical studies are important tools in determining the exact diagnosis and ultimate prognosis of acute leukaemia<sup>14</sup>. But facilities are not commonly available and high cost make them difficult to do in developing countries<sup>15</sup>.

### MATERIAL AND METHODS

This was a cross-sectional descriptive study, conducted in the Department of Child Health, Khyber Teaching Hospital Peshawar, Pakistan, from June 2016 to December 2017. A total of 50 newly diagnosed cases of acute leukaemia (subtypes of ALL and AML) were selected through non randomised convenient sampling. Patients less than 15 years with clinical features suggestive of Acute Leukaemia were included while patients more than 15 years and under treatment chemotherapy/ radiotherapy were excluded. Common clinical features were noted along with hematological parameters. The cases were then managed according to standardized management criteria.

### RESULTS

Out of 50 patients 31 were male and 15 were female that presented with acute lymphoblastic leukaemia and 4 patients were of acute myeloid leukaemia with two patients male and 2 female. Out of 50 patients 46 cases presented with acute lymphoblastic leukaemia and 4 cases presented with acute myeloid leukaemia Table 1. On bone marrow examination ALL L1 was predominant type. The clinical features of ALL & AML is shown in Table 2. There were 44 cases of ALL L1, 2 cases of ALL L2 and no cases of ALL L3 noted. In acute myeloid leukaemia 2 cases were that of AML type M2 and two of AML M4 and no cases observed in types M0, M3 and M5. The statistics of leukaemia is shown in Table 3.

**Table 1: Demographic features of ALL & AML**

Age in years	Frequency of ALL	
<1	2	
1-5	24	
5-10	13	
>10	7	
Age in years	Frequency of AML	
<1	0	
1-5	2	
5-10	1	
>10	1	
Gender	ALL	AML
Male	31	2
Female	15	2

**Table 2: Shows clinical presentation of ALL and AML**

Clinical features	ALL	AML
Fever	36	3
Pallor	37	3
Bone pain/ tenderness	13	2
Bruises/ Patehia	12	4
Spleenomagaly	28	3
Hepatomegaly	27	1
Abdominal pain/ vomiting	9	1
Lymphadenopathy	17	1

**Table 3: Statistics**

	ALL	AML
Mean	8.6	4.3
Median	2.5	2.5
Mode	2.5	2.5

### DISCUSSION

Leukaemia ranks as the second common malignancy<sup>16</sup>. Therefore it is important to determine the number of patients suffering from ALL and AML and their distribution according to the Age, Gender and clinical presentation. All these parameters were analysed in this study. In this study 46 (92%) patients were suffering from ALL and 4 (8%) were diagnosed as AML. This was also mentioned in Fasseh et al where 42 patients were having ALL and 35 patients were diagnosed as AML<sup>16</sup>. Fab classification for ALL and AML are universally accepted. In this study, L1 subtype of ALL was found to be more prevalent followed by L2 subtype and no cases found on L3 subtype. This classification is important as treatment and prognosis are different. L1 has been previously reported to be more prevalent than the other two subtypes by Fasseh et al<sup>16</sup> and ParveenR et al<sup>17</sup>.

M2 were found to be more prevalent in AML's Fab subtypes. There was only one case each of M1 and M4 while no cases of M0, M3 and M5. The prevalent subtype of M2 was also reported by Fassih et al<sup>14</sup>. While the prevalence of other subtypes were different compared with other studies<sup>18,19</sup>. M4 was found to be most prevalent by Asif et al<sup>18</sup>. Acute leukaemia were found to be more common in males as compared to female. ALL vs AML were (31 vs 15) and (2 vs 2) respectively. This is consistent with previous study and literature<sup>19,20</sup>.

## CONCLUSION

Acute lymphoblastic leukaemia was the most common type of leukaemia followed by myelogenous leukaemia, males were much more affected than females, major improvements in therapy and supportive care have led to increased survival rates.

## RECOMMENDATIONS

Early diagnosis and treatment is important as it can be too good for remission and cure rates.

## REFERENCES

1. Doctors Conter V, Rizzari C, Sala A, Chiesa R, Citterio M and Professor Biondi A. Acute lymphoblastic leukaemia December 2004.
2. L'owenberg B, Downing JR, Burnett A. Acute myeloid leukemia. N Engl J Med. 1999;341(14): 1051-62.
3. Dohner H, Estey EH, Amadori S. European Leukemia Net. Diagnosis and management of acute myeloid leukemia in adults: recommendations from an international expert panel, on behalf of the European Leukemia Net. Blood. 2010;115(3):453-74.
4. Bennett JM, Catovsky D, Daniel MT, et al. Proposals for the classification of the acute leukaemias. French-American-British (FAB) co-operative group. Br J Haematol. 1976;33(4): 451-58.
5. Roland B. Walter, Megan Othus, Alan K. Burnett,-BobL'owenberg, et al. Significance of FAB subclassification of "acute myeloid leukemia, NOS" in the 2008 WHO classification: analysis of 5848 newly diagnosed patients. Blood journal.org. Nov 10 2017.
6. Jaffe ES, Harris NL, Stein H. World Health Organization Classification of Tumours: Pathology and Genetics of Tumours of Haematopoietic and Lymphoid

Tissue. Lyon, France: IACR; 2001.

7. Vardiman JW, Thiele J, Arber DA. The 2008 revision of the World Health Organization (WHO) classification of myeloid neoplasms and acute leukemia: rationale and important changes. Blood. 2009;114(5): 937-51.
8. Gurney JG, Severson RK, Davis S, Robison LL. Incidence of cancer in children in the United States. Sex-, race-, and 1- year age-specific rates by histologic type. Cancer 1995;75: 2186-95.
9. Miller, R.W. Radiation. Chromosomes and viruses in the etiology of leukemia. Evidence from Epidemiologic Research. N. Engl. J. Med., 1964;271:30-34.
10. Ichimaru M, Ishimaru T. and Belsky, JL. Incidence of leukemia in atomic bomb survivors belonging to a fixed cohort in Hiroshima and Nagasaki, 1950-1971: Radiation dose, years after exposure, age of exposure and type of leukemia. J. Radiat. Res., 1978;19:262-67.
11. Acute lymphoblastic leukaemia Doctors Conter V, Rizzari C, Sala A, Chiesa R, Citterio M and professor Biondi A. December 2004.
12. Prevalence of hematological disorder, A bone marrow study of 177 cases in 9 Private hospital at Faridpur. SG Kabira, MDU Islam, ASMJ Choudhary. Faridpur med coll. J. 2010 ;5 (1) 11-13.
13. Taj Ali Khan, Irfan Ali Khan, Khalid Mehmood. Diagnostic role of bone marrow aspiration and trephine biopsy in haematological practice. September 09, 2013.
14. Piya MK, Acharya SC, Oncology in Nepal: South Asian J Cancer 2012; 1: 5-8.
15. Bashir M, Zaman S, Rafatullah, Wazir F, Shoaib M, Biland B. Hematological and clinical presentation of acute leukaemia at Khyber Pakhtunkhwa. J Med Sci 2010; 8: 134-40.
16. Faseeh S , Raziq F clinical presentation of acute leukaemia journal of college of physician and surgeon Pakistan 2014.24 (7) 472-76.
17. Perveen R, Yasmeen N, Hassan K. Prognostic factors of Acute lymphoblastic leukaemia in children. Ann Pak Inst Med Sci 2010;6:24-27.
18. Asif N, Hassan K, Yasmeen N. Acute myeloblastic leukaemia in children. Int J Pathol 2011;9:67-70.
19. Kakepoto GN, Burney IA, Zaki S et al. Long term outcomes of Acute myeloid leukaemia in adults in Pakistan. J Pak Med Assoc 2002;52:482-86
20. Rubnitz JE, Gibson B, Smith FO. Acute myeloid leukaemia. Pediatr Clin North AM 2008; 55:21-51.

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## AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

- Afridi J:** Main Idea - data selection.  
**Amir S:** Literature Review  
**Muneer A:** Result.  
**Rahim F:** Final Remarks.  
**Rehman Y:** Typing Study and references .

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.