DOI: https://doi.org/10.53350/pjmhs2023171168

ORIGINAL ARTICLE

Clinico-Hematological Pattern of Haematological Malignancies in Patients Referred for Bone Marrow Examination

HAJRA AZHAR[1*], HAFIZ MUHAMMAD MATLOOB[2], NIDA KHALID[1], AYESHA RAHMAN[1], JAVERIA AFZAL[1], NAJMA QURESHI[3]
[1]*Department of Hematology, Holy Family Hospital, Rawalpindi, Pakistan.*
[2,3]*Department of Hematology, Mohi-ud-Din Islamic Medical College, Mirpur-AJK, Pakistan*
Correspondence to Dr. Ayesha Rahman, Email: ayeshausmamalik@gmail.com, Cell No 0333-5154745

ABSTRACT

Background: Chromosomal translocation is a common cause among hematological malignancies thus. a different diagnostic and treatment approach is required in these cases.
Aim: To determine frequencies and clinic-hematological features of different hematological malignancies among patients.
Methodology: It was a descriptive cross sectional study. Patients (n=284) with hematological malignancy were enrolled from total 1080 bone marrow biopsies. Detailed history, clinical examination and hematological parameters were recorded at time of presentation. Bone marrow aspiration and trephine biopsy were done as per the clinical indication. Data was evaluated by using SPSS version 23. Chi-square test was applied with p-value of less than 0.05 was considered significant.
Results: The study showed the high percentage of hematological malignancies (24%) were observed among enrolled patients with CML being the commonest cancer among them.
Practical Implication: This study established the clinic-hematological correlation and provided study based suggestions for better diagnosis and treatment of hematological malignancies while using bone marrow microscopic examination as an important diagnostic tool.
Conclusion: It was concluded that acute leukemias were common in younger age whereas chronic leukemias and lymphoproliferative disorders in more advanced ages.
Keywords: Hematological Malignancies, Bone Marrow Examination and Diagnosis.

INTRODUCTION

Leukemia is a white blood cell disorder involving the bone marrow[1]. It is a malignant disorder of hematopoietic tissue that is associated with uncontrolled abnormal proliferation of malignant white blood cells in the bone marrow[2]. The malignant white blood cells cause infiltration of the bone marrow stroma, accumulate there, spill into the circulation and thus infiltrate other tissues of the body as well[3]. The infiltration of the tumour cells into the bone marrow causes the replacement of other normal hematopoietic cells like erythroid precursor cells and megakaryocytes by abnormal tumour cells referred to as blasts[4]. This leads to decreased production of red blood cells and platelets , manifesting as anemia and thrombocytopenia in patients of leukemia[5,6].

Literature review revealed that microscopic bone marrow examination is one of the important diagnostic procedures in field of hematology. According to the newest guidelines by WHO, more precise morphological criteria were defined depending on microscopic examination of cells thus, added to its importance.[1,7] Most cases of leukemia commonly develop in the male population[3].

Leukemias are generally classified into two categories i.e acute leukemias and chronic leukemias[8]. The acute leukemias are then further classified into acute myeloid leukemia (AML) and acute lymphoblastic leukemia (ALL). Chronic leukemias are further subclassified into chronic lymphocytic leukemia (CLL) and chronic myeloid leukemia (CML)[9]. Acute myeloid leukemia (AML) is common in adults, while acute lymphoblastic leukemia (ALL) is common in children[6,7].

According to any studies, treatment with proper diagnosis of all hematological malignancies demands perfect and accurate bone marrow examination. It requires both cytological and histological specimens. Cytological specimen allows excellent visualization of cell morphology while other specimen evaluates cellularity, fibrosis or infiltrative disease[4].

Unfortunately, in modern era with advancement in every field of life, the prevalence of hematological malignancies has increased. These malignancies usually affect all ages and both genders without much discrimination as revealed by literature review. These malignancies include leukemia and lymphoma[5,6]. In-

Received on 11-08-2022
Accepted on 22-12-2022

order to diagnosis hematological health issues, multi-parameter approach has to be taken that includes morphologic examination and phenotypic or genotypic studies. Etiological factors that expose its victims to such diseases include genetic predisposition, infections, drugs, radiations and tobacco use as documented by studies[3]. This study established the clinic-hematological correlation and provided study based suggestions for better diagnosis and treatment of hematological malignancies while using bone marrow microscopic examination as an important diagnostic tool. Due to the increasing burden of malignancies among our population and lack of research culture, we planned current project to see the significance of bone marrow exam in hematological malignancies.

The objective of the study was to determine frequencies and clinic-hematological features of different hematological malignancies among patients.

METHODOLOGY

was a descriptive cross sectional study conducted after ethical approval. Patients (n=284) with hematological malignancy were enrolled from total 1080 bone marrow biopsies. Detailed history, clinical examination and hematological parameters were recorded at time of presentation. Bone marrow aspiration and trephine biopsy were done as per the clinical indication. Hematological parameters were defined as: anemia <11g/dL, leukopenia <4000 /ul, leukocytosis >11000/ul and platelet count <100 × 10^9 /L. Already diagnosed cases, follow up cases of hematological malignancy and patients referred for staging of malignancy were excluded. A consent form was signed by every participant

Statistical analysis: Data will be entered and analyzed in SPSS version 23.0. At descriptive analysis, for categorical variables, frequency and percentages were figured like age, gender, anorexia, weight loss, weakness, pallor, bleeding, splenomegaly, hepatomegaly, lymphadenopathy, anemia, WBCs, platelets and type of malignancy. Mean and standard deviation were calculated for continuous variables of age, hemoglobin, WBCs and platelets. Chi-square test was applied with p-value of less than 0.05 was considered significant.

RESULTS

The ages of patients ranged from 15-80 years with average age of 42 years. Male to female ratio was 2:1. Out of the total 1080 cases of bone marrow biopsies, 284(26%) were hematological malignancies and 796(74%) cases were of other disorders as shown by table-1. All hematological malignancies were grouped into acute leukemia, chronic leukemia and lympho-proliferative disorders. Their prevalence was shown as percentage in table-1

Table-1: Baseline Data (n=1080)

Parameters	Groups	Frequency(%)
Cases	Malignancies	284(26%)
	Others	796(74%)
Hematological malignancies (n=284)	Acute leukemia	42%
	Chronic leukemia	29%
	Lympho-proliferative Disorders	29%

The results showed that acute leukemia was more common in younger age group (15-25 years), chronic leukemia was more prevalent in middle age group (46-55 years) whereas LPD was found in older individuals (>56 years of age) as shown by table-2.

Table-2: Correlation of Acute Leukemia, Chronic Leukemia and LPD with Age

Age	Acute	Chronic	LPD
15-25	40	8	9
26-35	30	19	5
36-45	25	16	16
46-55	11	20	21
>56	14	20	30
Total	120	83	81

All hematological malignancies were more common in males as depicted by percentage in Figure-1.

Figure-1: Correlation of acute leukemia, chronic leukemia and LPD with gender (n=284)

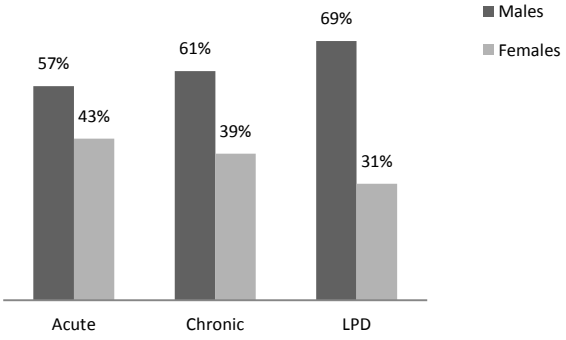
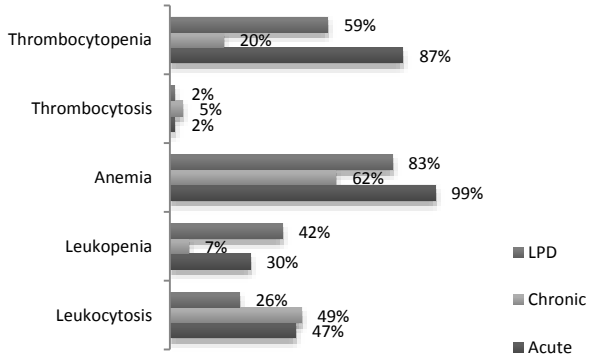


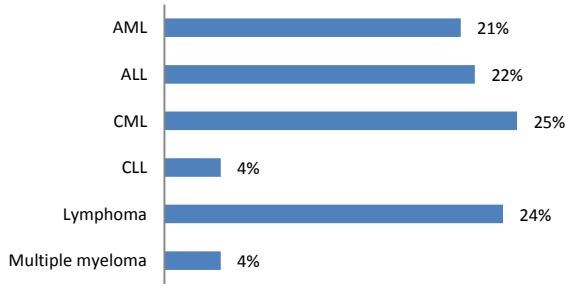
Figure-2: Correlation of acute leukemia, chronic leukemia and LPD with hematological parameters



Lymphoproliferative disorders commonly presented with pancytopenia. Leukocytosis was common in both acute and chronic leukemias and anemia was the most frequent finding in all the hematological malignancies as shown by figure-2.

The prevalence of chronic myeloid leukemia was highest (25%) among hematological malignancies whereas chronic lymphocytic leukemia and multiple myeloma was lowest as depicted by figure-3.

Figure-3: Prevalence of hematological malignancies (n=285)



DISCUSSION

Hematological malignancies are a diverse group of blood cancers with different etiology, occurrence, prognosis and survival.[7] Previous studies indicated that the prevalence of both myeloid and lymphoid malignancies increases with age by using WHO classification.[8-10] Various studies revealed that occurrence of lymphocytic leukemia/lymphoblastic leukemia tops at 0– 14 years, while Hodgkin lymphoma and Burkitt lymphoma cases chiefly occur at 15– 44 years of age[11,12]. Another studies reveled that myeloid and lymphoid malignancies occurred in older patients approximately 70 years old[13-16]. Hematological malignancies are not an infrequent occurrence in Pakistan. Unfortunately very less data is available in this regard[14].

Our study was performed in a tertiary care hospital of Rawalpindi. 284 patients were included in the study with a male to female ratio of 2:1. All the hematological malignancies were common in males. Among the adult population which we selected in this study, we found out that the prevalence of acute leukemia was higher in age group of 15-45 years; highest in 15-25 years (70%). As the age advances, the chance of chronic leukemia and lymphoproliferative disorders increases. Chronic leukemia was common in 46-55 years (38%) whereas lymphoproliferative disorders were common among individuals of 56 years and above (47%). Pancytopenia was the most frequent occurrence in LPD. Most of the acute and chronic leukemias had leukocytosis whereas almost all hematological malignancies presented with anemia. In

addition it was revealed that CML was the most common among all leukemias found in our setup (25%).

Although, Holy Family Hospital is a major tertiary care hospital of Rawalpindi, yet it is not a true depicter of prevalence of hematological malignancies in our society. More work up is required in this regard to truly reveal the incidence, etiology and outcome of this unfortunate ailment. Only then we can totally cure our patients from the physical, mental and psychological dilemmas of this disease. Hopefully with the advancement of medical science we can treat our patients more effectively and efficiently. The disease requires advanced and expensive laboratory investigations and prolonged treatment in most of the cases, not to mention in some individuals our only hope is bone marrow transplantation. We are hoping that both the government and private sectors will join hands in this regard to provide proper health care units to these patients.

Limitations of study: The limitations included single centre study with limited resources and finance.

CONCLUSIONS

It was concluded that specific association of hematological malignancies with particular age groups such as acute leukemia was more common in younger age, chronic leukemia in adult age and lymphoma in older age. Patients at the time of diagnosis with all types of hematological malignancies were suffering from anemia and thrombocytopenia but leukocytosis was only common in myeloid leukemia. Chronic myeloid leukemia was the most common malignancy in our setup, second being lymphoma. Most of the patients presented with fever and pallor. Anemia was the most frequent laboratory finding.

Author's contribution: HA&HMM: Overall supervision and Write up and literature review, **NK&AR:** Statistics application, analysis literature review, help in write up, **JA&NQ:** Literature review help in write-up.

Conflict of interest: None

Funding: None

REFERENCES

1. Krzysztof Lewandowski, Agnieszka Complak, And Andrzej Hellmann Microscopic Examination Of Bone Marrow Aspirates In Malignant Disorders Of Hematopoiesis—A Comparison Of Two Slide Preparation Techniques Ann Hematol. 2012 Apr; 91(4): 497–505
2. Kumar V, Sardana R, Kishore M, Marwah S, Nigam AS, Bhardwaj M. Bone Marrow Cytomorphology And Clinico-Hematological Profile of Metastatic Solid Tumors: A 5-Year Audit from A Tertiary Care Centre in Northern India. Annals Path Lab Med. 2019;6(3):129-34.
3. Munir AH, Khan MI. Pattern of basic hematological parameters in acute and chronic leukemias. J.Med.Sci. 2019 ;26;27(2):125-9.
4. Naeem R, Naeem S, Sharif A, Rafique H, Naveed A. Acute Myeloid leukemia. Professional Med J. 2017;24(09):1302-5.
5. Preethi CR. Clinico-hematological study of acutemyeloid leukemias. Journal of Clinical and Diagnostic Research: JCDR. 2014;8(4):FC14.
6. Chang F, Shamsi TS, Waryah AM. Clinical and Hematological Profile of Acute Myeloid Leukemia (AML) Patients of Sindh. Journal of Hematology & Thromboembolic Diseases. 2016:4(2):23-9.
7. Rathee R, Vashist M, Kumar A, Singh S. Incidence of Acute and Chronic forms of Leukemia in Haryana. International Journal of Pharmacy and Pharmaceutical Sciences ISSN-0975-1491. 2014;6(2):323-5.
8. Masood A, Masood K, Hussain M, Ali W, Riaz M, Alauddin Z, et al. Thirty years cancer incidence data for Lahore, Pakistan: trends and patterns 1984-2014. Asian Pacific journal of cancer prevention: APJCP. 2018;19(3):709-17.
9. Grigoropoulos NF, Petter R, Van't Veer MB, Scott MA, Follows GA. Leukaemia update. Part 1: diagnosis and management. Bmj. 2013;346:f1660.
10. Zuckerman T, Rowe JM. Pathogenesis and prognostication in acute lymphoblastic leukemia. F1000prime reports. 2014;6:59.
11. Faiza Bashir, Bilal Sheikhu Mohydin, Irfan Khurshid, Samina Naeem, Abdul Hayee. Bone Marrow Aspiration Biopsy: Work-Up Of Metastatic Malignant Disorders Department Of Haematology, Services Institute Of Medial Sciences, Lahore.Correspondence To Dr. Faiza Bashir, Assistant Professor
12. Rodriguez-Abreu D, Bordoni A, Zucca E. Epidemiology of hematological malignancies. Ann Oncol. 2007;18(Suppl 1):i3–i8
13. Sant M, Allemani C, Tereanu C, De Angelis R, Capocaccia R, Visser O, et al. Incidence of hematologic malignancies in Europe by morphologic subtype: results of the HAEMACARE project. Blood. 2010;116(19):3724–34
14. Smith A, Howell D, Patmore R, Jack A, Roman E. Incidence of haematological malignancy by sub-type: a report from the Haematological Malignancy Research Network. Br J Cancer. 2011;105(11):1684–92
15. Sun J, Yang Q, Lu Z, He M, Gao L, Zhu M, et al. Distribution of lymphoid neoplasms in China: analysis of 4,638 cases according to the World Health Organization classification. Am J Clin Pathol. 2012;138(3):429–34
16. Yoon SO, Suh C, Lee DH, Chi HS, Park CJ, Jang SS, et al. Distribution of lymphoid neoplasms in the Republic of Korea: analysis of 5318 cases according to the World Health Organization classification. Am J Hematol. 2010;85(10):760