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ORIGINAL ARTICLE

Clinico-Pathological Features of Chronic Myelocytic Leukemia (CML) in Patients Presenting at A Tertiary Care Center

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ABSTRACT

Introduction: Chronic myelocytic leukemia (CML) is a slow growing disorder marked by excessive proliferation of cells of myeloid origin which do not lose their capacity to differentiate. Because of unavailability and un-affordability of such markers in most of our tertiary care centers, it is important to have a better understanding of clinical and hematological insight of this disease.

Objective: To determine the clinical and hematological features of chronic myelocytic leukemia on bone marrow examination and trephine biopsy

Material and method: The current study was cross-sectional study carried out at the Department of Hematology, Hayatabad medical complex, Peshawar from 8/4/2021 to 8/10/2021. In this study a total 196 patients were observed. The findings of bone marrow aspirate for morphology and phase of the disease, along with the trephine biopsy for bone marrow fibrosis were noted. All data with the demographic information like name, age, gender, occupation for further analysis were recorded.

Results: In the current study, totally 196 patients were included. There were 112(57%) male patients and 84(43%) patients were female in our study. Based on clinical features and hematological features of patients with chronic myelocytic leukemia, 153(78%) patients had splenomegaly, 102(52%) patients had fever, 192(98%) patients had leukocytosis, 94(48%) patients had anemia.

Conclusion: Our study concludes that the frequency of clinical and hematological features i.e. splenomegaly was 78%, fever was 52%, leukocytosis was 98%, anemia was 48% in patients presenting with chronic myelocytic leukemia.

Keywords: clinical and hematological features, chronic myeloid leukemia.

INTRODUCTION

Chronic myelocytic leukemia (CML) is a slow growing disorder marked by excessive proliferation of cells of myeloid origin which do not lose their capacity to differentiate. CML makes up to 15% of all leukemias in the world and it is always known to be a disease of adults [1, 2]. In western registries the median age is 60-65 years at diagnosis[3] and male to female ratio of 1.2-1.7 [4]. Annually, the incidence of CML ranges from 0.4-1.75 per 100,000 persons in various countries [4]. It is believed to be rare among children and young adults [5].

Chronic myelocytic leukemia, a common cause of morbidity is specified with markedly increased peripheral blood sscounts and visceromegaly. Most patients are asymptomatic and disease is usually diagnosed on routine blood examination [6]. The most common sign was splenomegaly and anemia [7] accounting for 75.8% [8] and 77.3%[9] respectively. Although it is considered to have same biology in all age groups, CML in children and adolescentshave more aggressive features and different prognostic factors [10].

Unlike West, Chronic myelocytic leukemia is common in younger age groups in most developing countries like Pakistan, with median age of 34-37 years at diagnosis [11]. In Pakistan it accounts for 16% of total hematological malignancies [12]. The pattern of progression is from chronic phase to accelerated and/or blast phase [13]. About 80% usually present in chronic phase [14] with markedly increased leucocyte counts. Most of the patients are asymptomatic and if not treated early can progress to an advanced disease. Clinical outcome for these patients has improved considerably following the use of tyrosine kinase inhibitors, if identified early and treated timely [15].

In our locality where various predisposing factors are contributing to increased incidence of CML, the data available is very scarce [16]. More studies are required to know the clinical and pathological features of the disease to reduce the rate of morbidity among our population. Presence of Philadelphia chromosome on cytogenetic studies is used for the diagnosis of CML. Because of unavailability and unaffordability of such markers in most of our tertiary care centers, it is important to have a better understanding of clinical and hematological insight of this disease and its burden in our population. It still remains a life-threatening malignancy due to lack of demographic and clinical data. The findings in our study could serve as baseline in this population.

MATERIALS AND METHODS

The current study was cross-sectional study carried out at the Department of Hematology, Hayatabad medical complex, Peshawar. The study duration was 6 months (from 8/4/2021 to 8/10/2021). The sample size in the current study was 196 by using 75.8% [8] proportion of splenomegaly and 6% margin of error. The inclusion criteria in our study was **p**atients having age limit between 20-60 years, both male and female, patients with >25 × 10^9/L total leucocyte count on peripheral smear with increased proliferation of granulocytes and patients with blast cells <20% and basophils in peripheral blood examination. The exclusion criteria in our study were patients already on treatment or with history of other hematological malignancy, all patients with findings suspicious of acute lymphoblastic or acute myeloid leukemia on peripheral smear. History and blood counts of all such patients were reviewed and were excluded.

On approval of my study from the hospital ethical committee, I had included the patients fulfilling the inclusion criteria. History and detailed examination of the patients referred to us for bone marrow aspiration and trephine biopsy from other departments was recorded. All hematological parameters were noted. After informed consent, bone marrow aspiration and trephine biopsy were done followed by staining and reporting. The findings of bone marrow aspirate for morphology and phase of the disease, along with the trephine biopsy for bone marrow fibrosis were noted. All data with the demographic information like name, age, gender, occupation for further analysis were recorded. Analysis of the data was done using SPSS software (version 25). Data was comprise of numerical variables i.e. age, Hb, platelet, total leucocyte count (TLC) and categorical variables, including ordinal i.e. age groups and nominal i.e. gender, phase of disease and clinical features (hematological parameters). Quantitative variables like age, total leucocyte count, Hb, platelet was presented with mean with

standard deviation in case of normally distributed and in case of skewed distribution the data was presented as median with range. Categorical variables (nominal and ordinal) were presented as frequency/proportion/percentage.

RESULTS

In the current study, totally 196 patients were included. There were 112(57%) male patients and 84(43%) patients were female in our study. (Figure 1) The mean age (±SD) in our study was 48 (±12.571) years. Based on age distribution, 74(38%) patients were 20-40 years old while 122(62%) patients were observed in 41-60 years age group. (Figure 2)

Based on phases of chronic myelocytic leukemia, 164(84%) patients had chronic phase, 24(12%) patients had accelerated phase, 8(4%) patients had blast crisis phase. (Figure 3) Mean total leucocyte count/µL and Mean Hb level (gram/100 ml) was 182.5 × 10^3/µL and 10 gram/100 ml respectively.

Based on clinical features and hematological features of patients with chronic myelocytic leukemia, 153(78%) patients had splenomegaly, 102(52%) patients had fever, 192(98%) patients had leukocytosis, 94(48%) patients had anemia. (Figure 4)

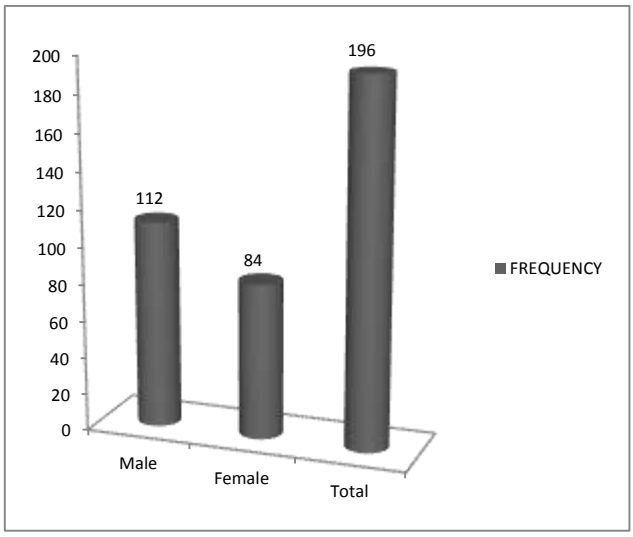

Figure 1: Distribution of patients based on gender

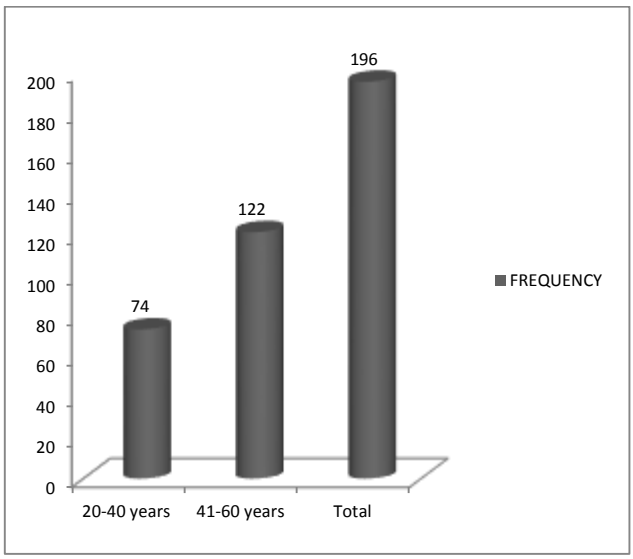

Figure 2: Distribution of patients based on age

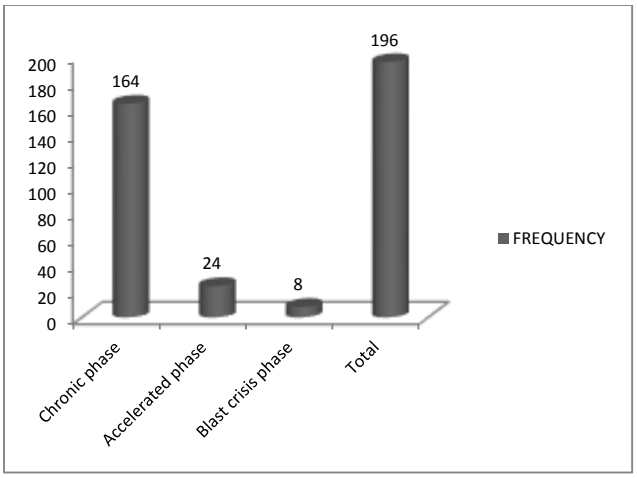

Figure 3: Distribution of patients based on age phases of chronic myelocytic leukemia

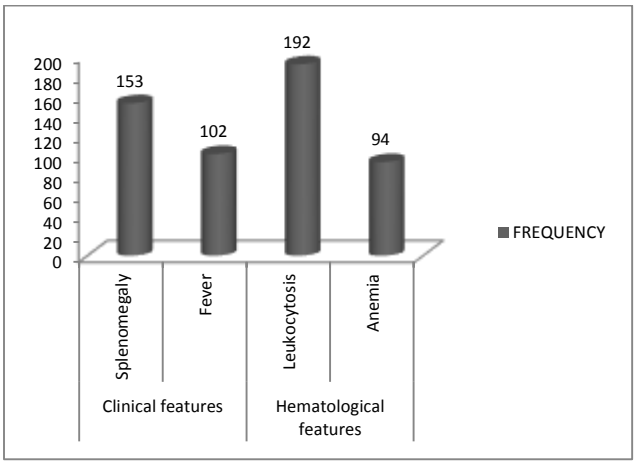

Figure 4: Distribution of patients based on clinical and hematological features of patients with chronic myelocytic leukemia

DISCUSSION

Chronic myelocytic leukemia (CML) is a slow growing disorder marked by excessive proliferation of cells of myeloid origin which do not lose their capacity to differentiate. CML makes up to 15% of all leukemias in the world and it is always known to be a disease of adults [1, 2]. In western registries the median age is 60-65 years at diagnosis[3] and male to female ratio of 1.2-1.7 [4]. Annually, the incidence of CML ranges from 0.4-1.75 per 100,000 persons in various countries [4]. It is believed to be rare among children and young adults [5]. Our study was carried out to assess the clinico-pathological features of chronic myelocytic leukemia (CML) in patients presenting at a tertiary care center.

In our study, totally 196 patients were included. There were 57% male patients and 43% patients were female. The mean age (±SD) in our study was 48 (±12.571) years. Based on age distribution, 38% patients were 20-40 years old while 62% patients were observed in 41-60 years age group. Based on phases of chronic myelocytic leukemia, 84% patients had chronic phase, 12% patients had accelerated phase, 4% patients had blast crisis phase. Mean total leucocyte count/µL and Mean Hb level (gram/100 ml) was 182.5 × 10^3/µL and 10 gram/100 ml respectively. Based on clinical features and hematological features of patients with chronic myelocytic leukemia, 78% patients had splenomegaly, 52% patients had fever, 98% patients had leukocytosis, 48% patients had anemia. A study conducted by Bhatti FA et al. reported that 80% of myeloproliferative disorders

are constituted by CML. Their incidence occurs in majority of the patients in 21-50 years age group. Their main clinical feature was anemia in 92% patients and splenomegaly in 47% patients. Degree of splenomegaly was associated significantly with WBC counts and anemia [17]. In Caucasian populations, this problem occurs in majority of the patients in 6th to 7th decade while in Pakistani population CML occurs in majority of the individuals in 21-50 years of age group. This is because of no access to proper health care facilities because of non-affordability and there is no health insurance system.

A total of 90 patients with chronic myeloproliferative diseases appeared, and all 90 individuals were given the diagnosis of CML, according to a research by Kumar S et al. [7]. Patients' ages ranged from 5 to 72 years, with the median age of CML presentation being 37 years and the average age being 38.6 years. In general, those between the ages of 31 and 40 were most often impacted. At the time of diagnosis, all patients had symptoms. Patients often experienced abdominal fullness (66.6%), accompanied by weakness in 63%, fever in 59% and tiredness in 55.5%. Anemia and splenomegaly were the most prevalent symptoms. The prevalence of mild, moderate, and massive splenomegaly was 13 (17.3%), 20 (26.6%) and 42 (56%) respectively [7].

Our research entirely disagreed with the global study conducted by Savage et al. Weight reduction (20%) was the most prevalent characteristic in this research. This may be justified by the reality that symptomatic individuals as well as patients chosen based on screening criteria are included in research in western nations. Splenomegaly was observed in 75.8% of patients in the study carried out by Savage et al. Massive splenomegaly, moderate splenomegaly and mild splenomegaly was observed in 62.2%, 22.2% and 15.6% of patients respectively. A median value of 9.5 g/dL and a mean hemoglobin of 9.41 1.75 g/dL were recorded [8].

CONCLUSION

Our study concludes that the frequency of clinical and hematological features i.e. splenomegaly was 78%, fever was 52%, leukocytosis was 98%, anemia was 48% in patients presenting with chronic myelocytic leukemia.

REFERENCES

1. Reksodiputro AH, Tadjoedin H, Supandiman I, Acang N, Kar AS, Bakta I, et al. Epidemiology Study and Mutation Profile of Patients with Chronic MyeloidLeukemia (CML) in Indonesia. 2015.
2. Nguyen LT, Guo M, Naugler C, Rashid-Kolvear F. Incidence of chronic myeloid leukemia in Calgary, Alberta, Canada. BMC Res Notes. 2018;11(1):1-5.
3. Levine PH, Ajmera K, O'Neill B, Venkatesh V, Garcia-Gonzalez P, Hoffman HJ. Demographic factors related to young age at diagnosis of chronic myeloid leukemia in India. Clinical Epidemiology and Global Health. 2016;4(4):188-92.
4. Lin Q, Mao L, Shao L, Zhu L, Han Q, Zhu H, et al. Global, regional, and national burden of chronic myeloid leukemia, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. Front Oncol. 2020;10:580759.
5. Hijiya N, Millot F, Suttorp M. Chronic myeloid leukemia in children: clinical findings, management, and unanswered questions. Pediatric Clinics. 2015;62(1):107-19.
6. Granatowicz A, Piatek CI, Moschiano E, El-Hemaidi I, Armitage JD, Akhtari M. An overview and update of chronic myeloid leukemia for primary care physicians. Korean journal of family medicine. 2015;36(5):197.
7. Kumar S, Gupta VK, Bharti A, Meena LP, Gupta V, Shukla J. A study to determine the clinical, hematological, cytogenetic, and molecular profile in CML patient in and around Eastern UP, India. Journal of family medicine and primary care. 2019;8(7):2450.
8. Savage DG, Szydlo RM, Goldman JM. Clinical features at diagnosis in 430 patients with chronic myeloid leukaemia seen at a referral centre over a 16-year period. Br J Haematol. 1997;96(1):111-6.
9. Ngono APB, Tipane PA, Njonnou SRS, Timnou AT, Sango AJF, Ndom P, et al. Hematobiological Profile of Patients with Chronic Myeloid Leukemia at the Diagnosis in Yaoundé: A Cross-Sectional Study. Open Journal of Blood Diseases. 2020;10(04):110.
10. Hijiya N, Schultz KR, Metzler M, Millot F, Suttorp M. Pediatric chronic myeloid leukemia is a unique disease that requires a different approach. Blood, The Journal of the American Society of Hematology. 2016;127(4):392-9.
11. Mendizabal AM, Younes N, Levine PH. Geographic and income variations in age at diagnosis and incidence of chronic myeloid leukemia. Int J Hematol. 2016;103(1):70-8.
12. Sultan S, Irfan SM, Ali N, Nawaz N. Institutional-based tumor registry of hematopoietic malignancies: A 4 years' preliminary report from Karachi. Journal of laboratory physicians. 2018;10(02):168-72.
13. Eichhorst B, Robak T, Montserrat E, Ghia P, Niemann C, Kater A, et al. Chronic lymphocytic leukaemia: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Ann Oncol. 2021;32(1):23-33.
14. Ahmed R, Naqi N, Hussain I, Khattak BK, Nadeem M, Iqbal J. Presentating phases of chronic myeloid leukaemia. J Coll Physicians Surg Pak. 2009;19(8):469-72.
15. Wajid AA, Zeeshan M, Mehmood F, Sharif I, Umair M, Ali A. Early molecular response with Imatinib therapy in chronic Myeloid Leukemia and its association with baseline white blood cell count and Spleen size. Pakistan Armed Forces Medical Journal. 2018(5):1199.
16. Memon AM, Ali N, Ahmed A. Immunophenotypic Analysis of Haematological Malignancies in Pakistani Population. Journal of Pioneering Medical Sciences. 2016;6(2).
17. Bhatti F, Ahmed S, Ali N. Clinical and hematological features of 335 patients of chronic myelogenous leukemia diagnosed at single centre in northern Pakistan. Clinical medicine Blood disorders. 2012;5:CMBD. S10578.