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Clinical and Hematological Profile of Patients with Chronic Myeloid Leukaemia in a Tertiary Hospital in North Bihar

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ABSTRACT

Introduction

We studied the clinical and hematological parameters of patients with Chronic Myeloid Leukemia who presented at Homi Bhabha Cancer Hospital, Muzaffarpur.

Materials and Methods

Between June 2022 and August 2022, we conducted a retrospective analysis of patient data at the Homi Bhabha Cancer Hospital in Muzaffarpur. Age, gender, location, occupation, and socioeconomic status of the patients were collected as part of their demographic information. A thorough history was examined, including the length of the symptoms, any bleeding manifestations, and the spleen's initial size (below the costal edge). The initial tests included a bone marrow examination, CBC, PBS, LFT, KFT, and serum electrolytes. Philadelphia chromosome or BCR-ABL translocation was demonstrated, together with the morphology of the patient, to diagnose CML. Dasatinib was started on 100 mg/day for all patients in the Chronic phase and 140 mg/day for individuals in the Transformation phase.

Results

It was seen that out of all the patients 33% subjects were females and 67% were males.The most frequent age group was 31 to 45 years with (54.41%) patients. Maximum participants were from lower middle-class

background (50%). All patients were symptomatic at the time of diagnosis. 86-90% had symptoms of abdominal discomfort. 83% of patients had Splenomegaly. 83% patients were in chronic phase at the time of diagnosis and rest in accelerated phase.

Conclusion:

We came to the conclusion that the majority of the patients were younger. The most frequent initial symptom was abdominal discomfort. Physically, massive splenomegaly was the most frequent finding. The majority of the patients had high TLC and anaemia. At the time of presentation, 75% of patients were in the chronic phase.

Keywords

Chronic Myeloid Leukemia, Biological Clues at Diagnosis**,** Hematology

INTRODUCTION

A form of blood cancer is "leukaemia". Depending on the type of blood cell involved, there are various types of leukaemia. Myeloid cells, which are immature cells that typically develop into mature red blood cells, white blood cells, or platelets, are the source of chronic disease [1]. Myeloproliferative disorders include chronic myeloid leukaemia (CML), essential thrombocythaemia (ET), Vasquez's disease (VD), and primary myelofibrosis (PMF). The BCR-ABL1 fusion protein with severely dysregulated tyrosine kinase activity is produced as a result of a balanced translocation between chromosomes 9 and 22 (the Philadelphia chromosome) [2] [3].

In chronic myeloid leukaemia, the bone marrow overproduces myeloid blood cells, including immature granulocytes, metamyelocytes, and myeloblast cells, which are at different stages of maturation. At the time of the diagnosis, platelets and basophils (myeloid cells) are also produced in excess. The abnormal generation of RBCs is ultimately stopped by the bone marrow's overproduction of myeloid blood cells.

The fusion protein BCR-ABL, which is a constitutively active cytoplasmic tyrosine kinase [4] and the cause of the unchecked proliferation, is the molecular result of the translocation.

15% to 20% of adult leukaemias have CML [5]. It is a type of blood cancer for which epidemiological information is still lacking [6]. With a little male predominance, CML has an annual incidence of 1–2 new cases per 100,000 people in France [7]. Similar to the average of the nations in central and northern Europe [6] [8], its incidence is also comparable. The incidence of CML was 1.75/100,000 people in the US each year, and it rose with age [9]. According to the American Cancer Society (ACS), 620 men and 470 women will die from CML in 2018 according to their estimations [10]. CML can affect people of any age, however it is most common in adult males between the ages of 30 and 60. Despite the fact that Caucasians appear to be more afflicted than people of colour, there is no evidence of a geographic or racial specificity. Rarely can we find epidemiological information on CML patients in Sub-Saharan Africa (SSA). The majority of research on this subject was centred on assessing patient survival after imatinib therapy [11–15].

Splenomegaly and hepatomegaly were recognised as poor survival risk factors by Boma et al. in the early 2000s [15]. As risk factors for poor survival in Ivory Coast, Silué et al. [16] reported further chromosomal abnormalities, hepatomegaly, fever, bone pain, lymphadenopathies, poor general health, high Sokal index, eosinophilia > 5%, and circulating blasts. We

are aware of no information regarding the biological presentation of CML patients at diagnosis. We felt it was crucial to define this population's biological makeup.

MATERIALS AND METHODS

From June 2022 to August 2022, data on patients at Homi Bhabha Cancer Hospital Muzaffarpur who had just received a new CML diagnosis were retrospectively examined. Age, gender, location, occupation, and socioeconomic status of the patients were collected as part of their demographic information. A thorough history was examined, including the length of the symptoms, any bleeding manifestations, and the baseline size of the spleen (below the costal edge).

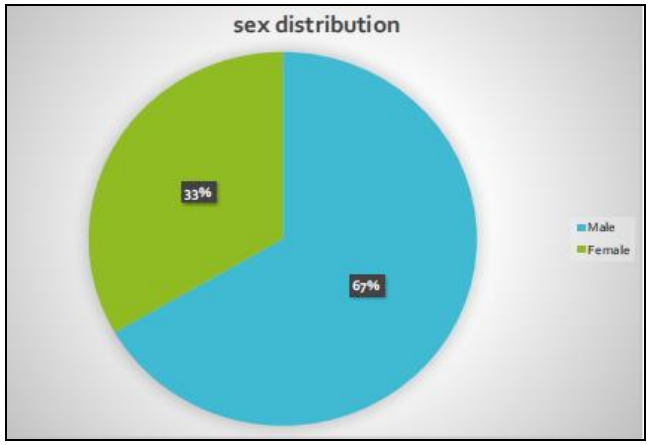
CBC, peripheral blood smear, LFT, KFT, serum electrolytes, and bone marrow examination were among the baseline tests. Philadelphia chromosome or BCR-ABL translocation was demonstrated, together with the morphology of the patient, to diagnose CML. All patients were started on Dasatinib at a dose of 100 mg per day for the chronic phase and 140 mg per day for the transformation phase.

Files of all subjects with CML (diagnosis made by cytogenetic and/or molecular biology) and presenting at least at the initial biological workup a full blood count were included, according to the inclusion criteria. Patients with incomplete files (especially in terms of diagnosis means and biological workup) were disqualified.

Included in the biological parameters were the diagnosis's methods (Karyotype and molecular research). A minimum full blood count was performed as part of the haematological workup to check for anaemia, leukocytosis, basophilia, and thrombocytopenia. Results from bone marrow aspirations and blood films were also documented.

Software programmes EPI-INFO V.3.5 and Statistical Package for Social Sciences (SSPS Inc, Chicago, Illinois, USA) V.20.0 were used to analyse the data. Means are used to portray quantitative data, and frequencies and percentages are used to present qualitative data.

RESULTS

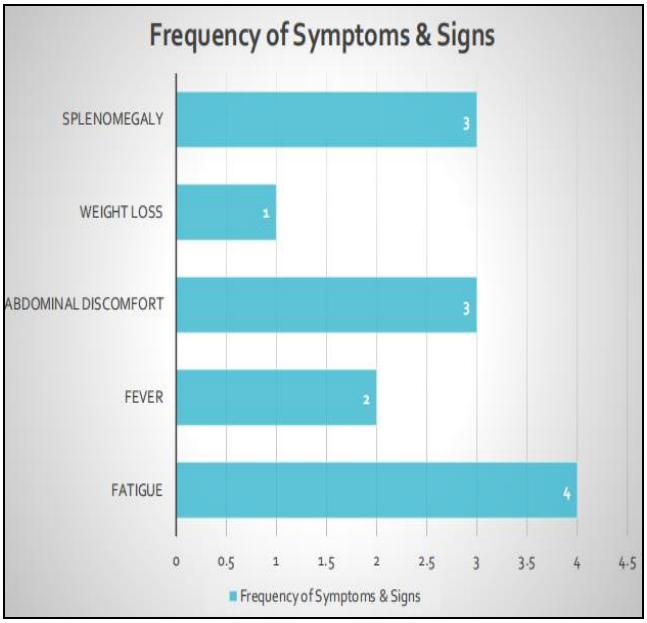


Graph 1: Distribution of gender among the patients

It was seen that out of all the patients 33% subjects were females and 67% were males (graph 1).The most frequent age group was 31 to 45 years with (54.41%) patients. Maximum participants were from lower middle-class background (50%). All patients were symptomatic at the time of diagnosis. 86-90% had symptoms of abdominal discomfort. 83% of patients had Splenomegaly. 83% patients were in chronic phase at the time of diagnosis and rest in accelerated phase.

Table 1: Demographic details

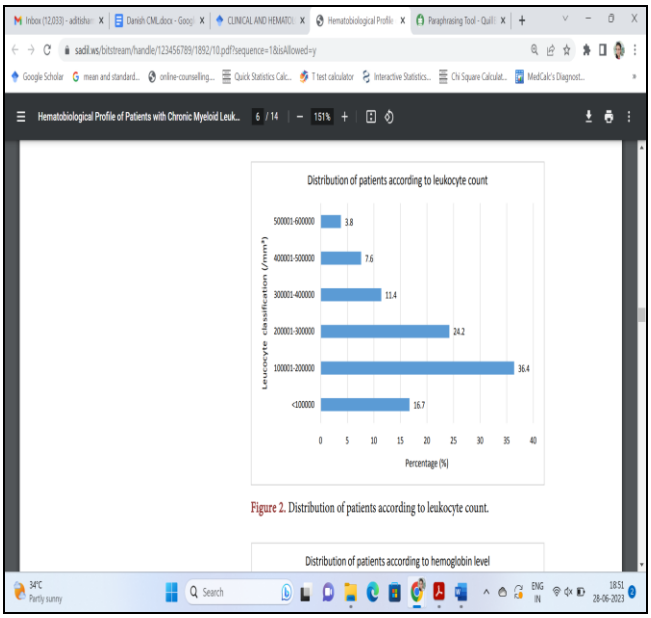
Variables	%
Age (in years)	
0-15	3.2
16-30	27.20
31-45	54.41
46-60	37.28
61-75	3.2
>75	2.2
Socioeconomic status	
Middle class	33
Lower Middle class	50
Lower class	17



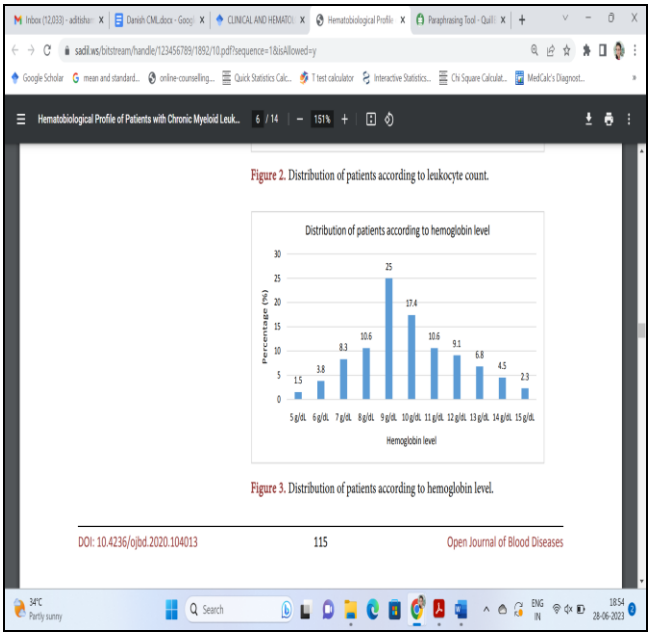
Graph 2: Frequency of sign and symptoms among the patients

Normocytic, Normochromic anemia with marked leukocytosis and presence of blasts cells, immature granulocytes and increased basophils were seen in the subjects.

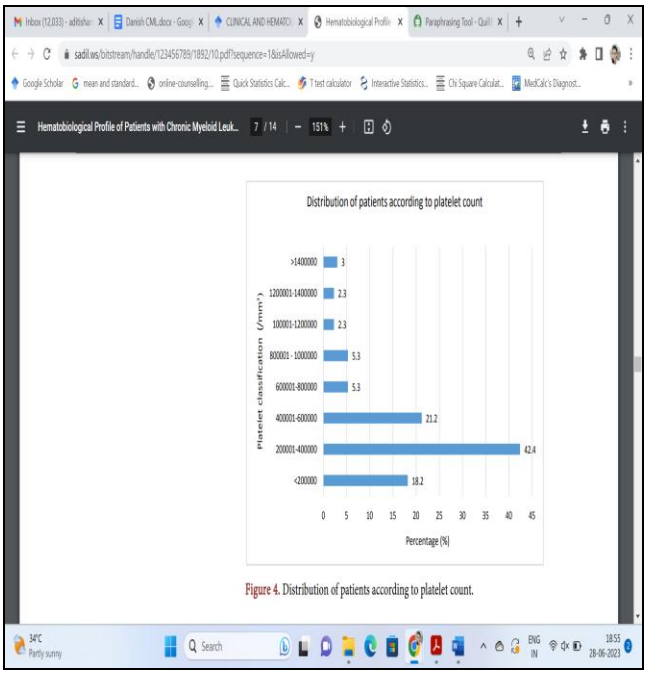
The granulocytic lineage of leukocytosis, which is associated with early myeloid cells, was found in all cases. All patients had the t (9; 22) and/or bcr-abl transcript. The range of leukocytosis was 27,988 to 588,700/m^3, with a mean of 128,367/mm^3. Leukocyte counts for the majority of the patients (60.6%) were between 100,000 and 200,000/mm3. Less than 500,000/mm of leukocytosis was present in only (3.8%) of the individuals.



Graph 3: Distribution of patients according to leucocyte count



Graph 4: Distribution of patients according to hemoglobin count



Graph 5: Distribution of patients according to platelet count

The majority of patients (86.4%) had anaemia. The range of haemoglobin values was 05 to 15, with a mean of 9.9 2 g/dL. The majority of the patients (42.4%) had haemoglobin levels in the 9–10 g/dL range. For 61.4% of the study group, the anaemia was moderate, and for 5.3%, it was severe. The average platelet count was 336,769 /mm3, with a range of 42,000 to 2,252,000/mm3. 42.4 percent of patients had a platelet count of between 200,000 and 400,000/mm3. 80 (60.6%) patients had normal platelet counts, while 41 (31.1%) patients had thrombocytosis and 11 (8.3%) patients had thrombocytopenia. Only 10 individuals (7.6%) had a platelet count above 1,000,000/mm3 (graph 3,4,5).

DISCUSSION

Patients may experience lack of energy and weariness from anaemia or bleeding, abdominal pain or discomfort, and in rare cases, bruising due to insufficient platelets. Patients with CML may be diagnosed at a routine examination or after seeking medical attention due to these symptoms [17]. Patients report left chest and abdominal pain as well as early satiety or a change in bowel habits as a result of the enlargement of the spleen. The majority of patients have more TLC upon diagnosis.

In 100%, 75.8%, and 7.6% of our patients, full blood counts (FBC), blood films, and bone marrow aspirations, respectively, were carried out. The blood film rate is lower than that carried out in Algeria if the FBC rate is comparable to other research [18]. By the same taken , the rate of bone marrow aspiration was incredibly low in comparison to Mupepe et al.'s [19] work. Only 97% of patients had a standard karyotype conducted (comparable to the majority of research), but 16.7% had FISH done at diagnosis [18]. 4.5% of patients had PCR done. This was greater than Mupepe et al.'s 0% but less than Djouadi-Lahlou et al.'s (11%), and less than Kueviakoe et al.'s (100%) [18] [19] [20].

The mean leukocyte count was 128,367/mm3, with a range of 27,988 to 588,700/mm3. Leukocyte counts for the majority of the patients (60.6%) were between 100,000 and 200,000/mm3. This outcome was consistent with Mupepe et al.'s findings, which showed that 55.2% of the population belonged to the 100,000 to 300,000/mm3 group [19]. Nearly identical findings were made by Mukiibi et al. [21]. The mean haemoglobin level was 9.9 g/dL, with a range of 5 to 15 g/dL. 86.4% of people in our demographic were anaemic. The majority of the patients had a g/dL between 9 and 10. For 61.4% of the study group, the anaemia was moderate, and for 5.3%, it was severe. Our statistics are comparable to those of Kueviakoe et al., who discovered an 88.9% prevalence of anaemia in Togo. In addition, the majority of their patients had moderate anaemia [20]. Our haemoglobin level, however, was comparable to Algeria's [18].

With a mean of 336,769, the platelet count varied from 42,000 to 2,252,000/mm3. The majority of our patients (42.4%) had it at 200,000–400,000/mm3, on average. While 32.1% exhibited thrombocytosis, 60.6% were in the normal range. Our results concurred with those of Mukiibi et al. and Mupepe et al., who discovered that the majority of their patients had a normal platelet count [19] [21]. 59.3% of our patients had basophile counts that were normal. Similar findings were made by Edjeme Gnaneli et al., who discovered that 77% of the population in their study had normal basophile counts [22].

CONCLUSION

We came to the conclusion that the majority of the patients were younger. The most prevalent presenting symptom was fatigue. Physically, splenomegaly was the most prevalent condition. All patients exhibited elevated TLC and a minor degree of anaemia on the CBC. On FISH, all patients had BCR-ABL1 t(9:22). When diagnosed, 75% of patients were in the chronic phase. Tyrosine kinase inhibitors like Imatinib and Dasatinib were effective for the majority of patients. Normalisation of TLC and improvement in anaemia were indicators of how the treatment was working.

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