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Research Article

Chronic myeloid leukemia in Nouakchott: epidemiological, clinical, cytological and therapeutic aspects: about 50 cases

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Abstract

Introduction: Chronic myelogenous leukemia (CML), a rare myeloproliferative neoplasms (MPNs) representing 2 to 5% of childhood leukemias and 15% of adult leukemias, according to the 2008 WHO classification and its 2016 update, it constitutes one of the preferred study models of leukemogenesis because tumor cells are characterized by an exchange of chromosomal material: the t (9;22) translocation, which leads to the formation of an abnormal chromosome 22, called the Philadelphia chromosome (Ph). The translocation leads to the formation of the BCR-ABL fusion gene.

Material and method: This are a retrospective study with analytical purposes, spread over 5 years (2018-2022), on 50 cases of CML, diagnosed and followed in Nouakchott.

Results: a male predominance with a sex ratio of 1.08, the average age was 43 years with extremes between 18 years and 69 years, splenomegaly was present in 94%, anemia was present in 34% of patients. the average white blood cell count was 169,364/ mm3, all patients presented myelemia associated with PMNs in the blood smear, the search for the Philadelphia chromosome (BCR/ABL) was positive in all patients, the evolution was favorable in 64%, death occurred in 12%.

Conclusion: The diagnosis of CML, although it is always mentioned on the clinical arguments (age, splenomegaly) and haematometric (hyperleukocytosis and myelemia), currently requires to be confirmed, either by the search for the Ph chromosome in cytogenetics, which allows in addition to detecting additional chromosomal anomalies or by FISH method which also makes it possible to detect cases of masked Ph and deletions of ABL, or by molecular biology by qualitative RT-PCR method allowing to detect with certainty the transcript of BCR/ABL.

Kew Words: chronic myeloid leukemia; myeloproliferative neoplasms; Philadelphia chromosome

Introduction

Chronic myelogenous leukemia (CML), a rare myeloproliferative neoplasm (MPNs) representing 2 to 5% of childhood leukemias and 15% of adult leukemias. according to the 2008 WHO classification and its 2016 update [1,2]

CML is one of the preferred models for studying leukemogenesis because the tumor cells are characterized by an exchange of chromosomal material: the t (9;22) translocation, which results in the formation of an abnormal chromosome 22, called the Philadelphia (Ph) chromosome. The translocation leads to the formation of the BCR-ABL fusion gene. In vitro and in vivo experiments have demonstrated that the Bcr-Abl protein, through its deregulated tyrosine kinase activity, is responsible for the disease.[3].

Indeed, the chimeric protein, encoded by the BCR-ABL fusion transcript resulting from this rearrangement, has a constitutively deregulated tyrosine kinase activity and is directly responsible for leukemic transformation.

In the absence of treatment, CML progresses within 3 to 5 years to a rapidly fatal acute leukemia. Treatments such as hydroxyurea or busulfan have very little effect on patient survival. Allogeneic bone marrow transplantation can cure patients but can only be offered to a limited number of patients. Interferon alpha (INF-α) has improved the survival of responding patients but these are few in number and the side effects have made its use limited. Today, imatinib mesylate, the first tyrosine kinase inhibitor specific to the Bcr-Abl protein, has become the first-line treatment for this blood disease, making CML an example of a blood disease requiring targeted therapy.

The long-term results of this new drug will determine the clinician's attitude towards allogeneic bone marrow transplantation, which is, until today, considered the only curative treatment.[4.5]

The diagnosis of CML, although it is always suggested on the basis of clinical (age, splenomegaly) and hematometry (hyperleukocytosis and myelemia) arguments, currently needs to be confirmed, either by the search for the Ph chromosome in cytogenetics, which also allows the detection of additional chromosomal abnormalities (ACA) or by FISH method which also allows the detection of cases of masked Ph and ABL deletions, or by molecular biology by qualitative RT-PCR, a method allowing the detection with certainty of the bcr/abl fusion transcript. Indeed, there are rare cases of so-called atypical CML not having the Ph. Moreover, it constitutes the biological data essential for monitoring the response to treatment with ITKs, which is based on the cytogenetic response which can be assessed using conventional karyotype or FISH and the molecular response requiring real-time RT-PCR, the most precise parameter for assessing residual disease.

The objective of our study is to highlight the epidemiological, clinical, hematological and cytogenetic characteristics of chronic myeloid leukemia in patients with CML followed in Nouakchott between 2018 and 2022.

Materials and Methods:

Our samples were collected at the National Hospital Center (CHN) and the National Oncology Center (CNO). Patients come from all medical facilities in the city of Nouakchott: private facilities, outpatient clinics and hospitalization services of the various hospitals. Our study spanned a five-year period from 2018 to 2022.Our study was retrospective. Data were collected from patient records. The study population was all adult patients of both sexes. All patients with confirmed CML were included in our study.

Results:

Over a period of 5 years; from 2018 to December 2022, we collected 50 cases of chronic myeloid leukemia meeting the inclusion criteria of our study. The number of male patients was 26 or 52%, compared to 24 female patients or 48%. That is a sex ratio of 1.08. The average age was 43 years with extremes between 18 and 69 years.

Clinical examination

Splenomegaly	Present	Absent
Number	47	3
Percentage	94%	6%

Table I: Distribution of patients according to the presence of splenomegaly

Paraclinical examination

Blood count

Hemoglobin

Hb (g/dl)	Anemia	Normal	Total
Numbers	17	33	50
Percentage (%)	34%	66%	100%

Table II: Distribution of patients according to the presence of anemia

WBC (10^3/ul)	<50	50-150	>150
Numbers	2	30	18
Percentage (%)	4%	60%	36%

Table III: Distribution of patients according to white blood cell count

Blood smear

100% of patients had myelemia associated with mature neutrophils.

Philadelphia chromosome (BCR/ABL) search:

In our study, all of our patients benefited from BCR/ABL testing which came back positive, i.e., 100%.

Ultrasound:

19 of our patients, or 38%, had an abdominal ultrasound scan that revealed splenomegaly; the remaining 31 patients, or 62%, did not have an abdominal ultrasound scan.

Treatment:

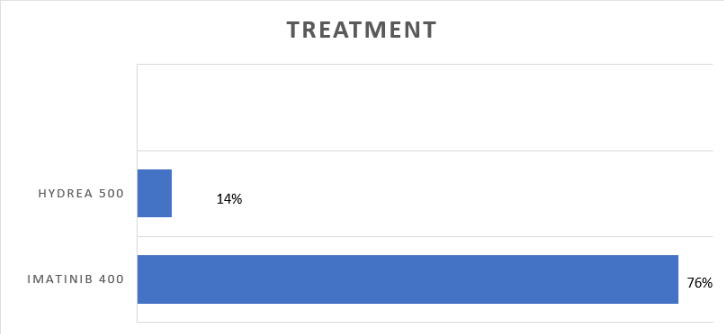

Figure 1 : Distribution of patients according to treatment

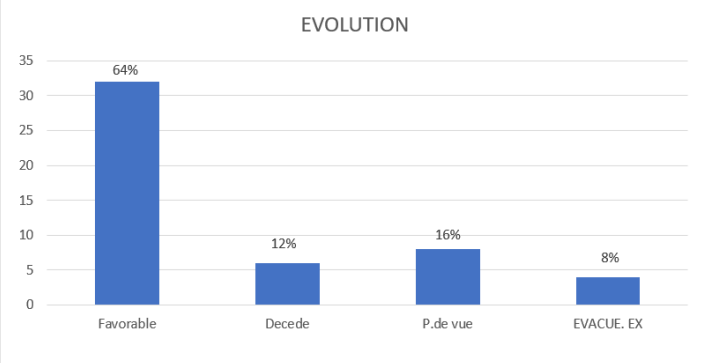

Figure 2 : Distribution of patients according to evolution-64% of patients had a favorable evolution and 16% were lost to follow-up, 12% died and 8% were evacuated at their request, outside.

Discussion:

Epidemiological aspects

Sex

In our study we have a male predominance with a sex ratio M/F of 1.08, which agrees with the data in the literature [6] and a study carried out in Niger with a sex ratio equal to 1.6 [8]. whereas in a study carried out in Morocco the female predominance was more marked with a sex ratio M/F of 0.72 [7].

The Age

Series	Country	Average Age (years)
Nacer Redhouane and al.[9]	Algeria	43.5
Elias Jabbour and al.[10]	United States	54
Segbena and al.[11]	Togo	40.5
Corm and al.[12]	France	56
SH Allah and al.[7]	Morocco	46.52
Our series	Mauritania	43

Table IV: Comparison of mean age with different studies

The average age in our study was above that of the study in Togo and close to that of the Algerian study, lower than that reported in Moroccan, French and American studies.

Clinical aspect

Splenomegaly

It was found in 47 patients, or 94%, which is higher compared to studies carried out in Morocco (82.6%) and Algeria (90%).[7.13], while in other studies it was found at 100%[8,14,15]

Paraclinical aspects

Blood count

The blood count is the most important test because it alone allows the diagnosis to be made. Hyperleukocytosis in CML is pronounced, greater than 20,109 leukocytes/L, mainly composed of polymorphonuclear neutrophils, associated with basophilia and eosinophilia. Myelemia is constant and harmonious, without a hiatus in differentiation, and blastosis is low in the chronic phase (<5%).[16]. Hyperleukocytosis was observed with mean levels of 169.3 G/L and extremes ranging from 48.4 to 295 G/L, this level is lower than those found in African studies 196.9 (54 to 284) and 296 G/L (extreme: 85-342)[8.17] The comparison of mean WBC rate from our series and other and studies is shown in Table V

Series	Average WBC rates (/mm^3)
Segbena et al.[11]	188710
Mukiibi et al.[18]	223700
Kohobo[19]	158000
El Mouhidi[20]	239000
JamalEddine et al.[17]	196900
SH. Allah et al.[7]	106111
Our series	169364

Table V: Comparison of mean WBC rate in our series and other studies

Blood smear

Myelemia was found at a rate of 100%. Myelemia (i.e. the passage into the blood of myeloid cells at all stages of differentiation) is constant, without a hiatus in differentiation, representing 10 and 50% of the elements[21], consisting of metamyelocytes, myelocytes and some promyelocytes and more rarely myeloblasts, this result is consistent with that of the different series to which our study was compared.

Philadelphia chromosome (bcr/abl)

In our series, 100% of patients in whom the cytogenetic study was carried out had a PHL chromosome, which is identical to the percentage found by Moroccan authors.[7].

Series	Percentage of beneficiaries	BCR-ABL positive
Segbena et al. [11]	100%	100%
Kohobo [9]	7%	100%
El Mouhidi [20]	3.7%	100%
JamalEddine et al. [17]	100%	100%
SH. Allah et al.[7]	52%	100%
Our series	100%	100%

Table VI: BCR/ABL positivity rates according to different studies

Therapeutic aspects

In our series 47 patients or 76% were on Imatinib 400mg and 3 patients or 14% on Hydrea 500mg.

Evolution

Six patients (12%) in our series died, all of these cases were due to accumulation or serious hematological and septic complications. This rate remains low compared to other series (Table VII).4 patients (8%) evacuated outside following their request.

Note that 8 (16%) patients were lost to follow-up, which suggests that the death rate may be higher.

Series	Number of patients	Number of deaths	Death rate (%)
Ongoren et al.[23]	21	4	19.04%
Quintas-Cardama et al.[24]	23	7	30%
Garg et al.[25]	34	4	8.33%
JamalEddine et al. [22]	10	0	0%
SH. Allah et al.[7]	114	6	5.25%
Our series	50	6	12%

Table VIII: Comparison of death rates between our series and other studies

Conclusion:

Chronic myeloid leukemia is a malignant haemopathy belonging to the group of myeloproliferative neoplasms (MPS) according to the WHO 2008 classification and its 2016 update, representing 2 to 5% of childhood leukemias and 15% of adult leukemias.

The aim of this study was to analyze the epidemiological, clinical, cytological and therapeutic aspects of chronic myeloid leukemia monitored at the National Hospital Center (CHN) and the National Oncology Center (CNO). During this study a predominance of the male sex was noted, with a sex ratio of 1.08, the average age of our population was 43 years with extremes between 18 and 69 years. The presence of splenomegaly was clearly marked in 47 patients or 94%. The blood count revealed anemia in 17 patients, or 34%.

All patients in our series, i.e., 100%, had hyperleukocytosis with PMNs predominance on the blood count.

All patients had myelemia associated with mature PMNs on blood smear. Philadelphia chromosome testing was positive in all patients. The evolution was favorable in 64% of patients and the death rate was 12%.

References:

1. Arber DA, Orazi A, Hasserjian R, Thiele J, Borowitz MJ, et al., (2016). The 2016 revision to the World Health Organization classification of myeloid neoplasms and acute leukemia. *Blood*. 127(20):2391-405.
2. Vardiman JW, Thiele J, Arber DA, Brunning RD, Borowitz MJ, et al., (2009). The 2008 revision of the World Health Organization (WHO) classification of myeloid neoplasms and acute leukemia: rationale and important changes. *Blood*. 114(5):937-951.
3. French Society of Hematology. (2007). Chronic myeloid leukemia. *Hematology*. 13(5): 328-330.
4. Druker BJ, Tamura S, Buchdunger E, Ohno S, Segal GM, Fanning S, et al. (1996). Effects of a selective inhibitor of the Abl tyrosine kinase on the growth of Bcr-Abl positive cells. *Nat Med*. 2(5): 561-566.
5. Hehlmann R, Hochhaus A, Baccarani M. (2007) Chronic myeloid leukaemia. *Lancet*. 370 (9584): 342-350.
6. D. Rea JM. Cayuela. Chronic myeloid leukemia. *EMC*. Volume 31 > n◦3 > August 2020. 13-011-B-10
7. Allah SH. Chronic myeloid leukemia: experience of the internal medicine department-clinical hematology about 114 cases 2021.
8. Bade MA, Andia A, Djibrilla A, Beydou A, Brah S, et al., (2015). Chronic myeloid leukemia treatment with tyrosine kinase inhibitors Experience of Niger. *Health Sci Dis*. l 16 (3) 1-4.
9. Algerian Society of Hematology and Blood Transfusion. CHRONIC MYELOID LEUKEMIA: National epidemiological study of chronic myeloid leukemia in Algeria. *Algerian Journal of Hematology*. 2010; 3:6-10.
10. Jabbour E., Kantarjian HM et al. Imatinib mesylate dose escalation is associated with durable responses in patients with chronic myeloid leukemia after cytogenetic failure on standard-dose imatinib therapy. *Blood*. 2009;113(10):2154-2160.
11. Segbena AY, et al. Chronic myeloid leukemia and imatinib, experience of the Lomé University Hospital Campus in Togo. *Tropical Medicine and Health*. 2012;22(3):307-311
12. Corm S et al. Kinetics of chronic myeloid leukaemia (CML) prevalence in Northern France since the introduction of imatinib. Journal of Clinical Oncology. 2008;26(15_suppl):7088.
13. Bouchra N, Kaouther B. Chronic Myeloid Leukemia and Molecular Biology
14. Mukiihi JM, Nyirenda CM, Paul B, Aduwuyi JO., Mzula EIB, Malata HN. (2003). Chronic myeloid leukaemia in central Africans. *East African medical journal*. 80(9):470-475.
15. Mupepe MD, Ngwala D, Kabengele OB, Mpwate KS. (2013). Epidemiological-clinical profile, therapeutic and evolutionary aspects of chronic myeloid leukemia at the University Clinics of Kinshasa. *African Annals of Medicine*. 6(3).
16. Baunin V. (2013). Chronic myeloid leukemia in children and adolescents: BCR-ABL1 molecular rearrangements at diagnosis. Online doctoral thesis. University of Poitiers, France. 216p.
17. A. JAMAL EDDINE et al., Tyrosine kinase inhibitors in chronic myeloid leukemia, a successful model of targeted therapy.

Thesis No. 107. Faculty of Medicine and Pharmacy of Marrakech. CADI AYAD University
18. Mukiihi JM et al. Chronic myeloid leukaemia in central Africans. *East African medical journal*. 2003;80(9):470-475
19. Kohobo C. Chronic myeloid leukemia: experience of the clinical hematology department of the Mohamed V military training hospital in Rabat. *Medical thesis* No. 346, Rabat 2016
20. El Mouhidi G. The clinical and cytogenetic aspects of chronic myelogenous leukemia, *medical thesis* No. 186, FES 2015
21. Leleu P, Moreau X. (2010). Summary of hematology and oncology. *Springer-Verlag* France.
22. Mahon FX et al., Follow-up of complete cytogenetic remission in patients with chronic myeloid leukemia after cessation of interferon alfa. *J Clin Oncol* 2002; 20:214-220.
23. Cortes JE et al., Ponatinib efficacy and safety in Philadelphia chromosome-positive leukemia: final 5-year results of the phase 2 PACE trial. *Blood*.2018;132(4):393-404.
24. Ongoren S et al. Third-line treatment with second-generation tyrosine kinase inhibitors (dasatinib or nilotinib) in patients with chronic myeloid leukemia after two prior TKIs: real-life data on a single center experience along with the review of the literature. *Hematology*. 2017:1-9.
25. Quintas-Cardama A et al. Dasatinib (BMS-354825) is active in Philadelphia chromosome–positive chronic myelogenous leukemia after imatinib and nilotinib (AMN107) therapy failure. *Blood*. 2007;109(2):497-509.

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