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Leukemias: Epidemiological, Diagnostic and Therapeutic Aspects in Patients Followed at the National Hospital of Niamey

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Abstract

Objective: Improve the care of patients followed for leukemia by taking stock of the epidemiological, diagnostic, and therapeutic situation in the Onco-Hematology department of the National Hospital of Niamey (HNN). **Methodology:** This was a retrospective study over a 10-year period from January 2010 to December 2019, combined with a 6-month prospective study from January 2020 to August 2020. We included 445 patients in the retrospective phase and 36 patients in the prospective phase. **Results:** We identified 481 cases of leukemia during our study period, representing an annual incidence of 48.8 cases. The 31 - 45 age group was the most affected, accounting for 23.5% of cases. Males predominated, representing 59.5% of cases, with a male-to-female ratio of 1.46. Abdominal masses were the most common reason for consultation, occurring in 11% of cases, followed by abdominal pain in 10.8%. Splenomegaly was the most frequent sign of tumor syndrome, observed in 38.5% of cases, followed by lymphadenopathy in 26.3%. Pallor of the skin and mucous membranes were noted in 32.6% of cases. According to the observed paraclinical findings, chronic myeloid leukemia (CML) accounted for 39.3% of cases, compared to 37.4% for acute leukemias (AML), 23.9% for acute myeloid leukemia (AML), 13.5% for acute lymphoblastic leukemia (ALL), and lastly, chronic lymphocytic leukemia (CLL) at 22.3%. The most frequently used chemotherapy regimen Imatinib, administered in 30.4% of cases. Regardless of the type of leukemia, the average survival did not exceed one year. **Conclusion:** Alt-

hough leukemias have become curable diseases nowadays, the prognosis remains poor in our developing countries due to both late diagnosis and delayed and inadequate treatment.

Keywords

Leukemia, Diagnosis, Treatment, Oncology-Hematology Department, Niger

1. Introduction

Leukemias are malignant hematological disorders characterized by uncontrolled proliferation of hematopoietic cells. Among leukemias, acute leukemias are distinguished by uncontrolled proliferation of hematopoietic stem cells, accompanied by maturation arrest, while chronic leukemias do not exhibit maturation arrest [1]. They are increasingly becoming a public health concern worldwide. In France, 35,000 cases were diagnosed in 2012 [2]. In sub-Saharan Africa, the incidence of leukemias was 13,091 cases, accounting for 2.4%, with mortality reaching 12,404 cases, or 2.2% in 2008 [3] [4]. In Niger, in 2002, they represented 45.22% of all cancers and 10.10% of all malignant tumors [5] [6]. Despite the delicate treatment requiring costly resources, a long treatment duration with significant side effects necessitating continuous follow-up, the prognosis remains very severe, particularly in our developing countries. In Niger, there are not many specific studies comprehensively addressing leukemias, and national data are scarce and fragmented. Existing data, integrated into broader cancer epidemiological analyses or focused on a single type of leukemia, do not provide specific information on leukemias as a whole. Hence, we aimed to assess the current state of leukemias diagnosed at the Onco-Hematology Department of the HNN.

2. Materials and Methods

Our study was conducted in the Onco-Hematology Department of the HNN. It was a retrospective cohort study spanning a 10-year period from January 2010 to December 2019, combined with a 6-month prospective observational study from January 2020 to August 2020. All patients, regardless of age or gender, who were hospitalized or followed up in the department and diagnosed with leukemia confirmed based on cytological examination (blood smear, bone marrow aspirate) and/or immunophenotyping were included. Consenting patients were included for the prospective component. The information collected included age, gender, sociodemographic data, as well as diagnostic and therapeutic methods. The data were entered and analyzed using Microsoft Office 2013 (Word, Excel) and SPSS software version 20.0.

3. Results

3.1. Sociodemographic Data

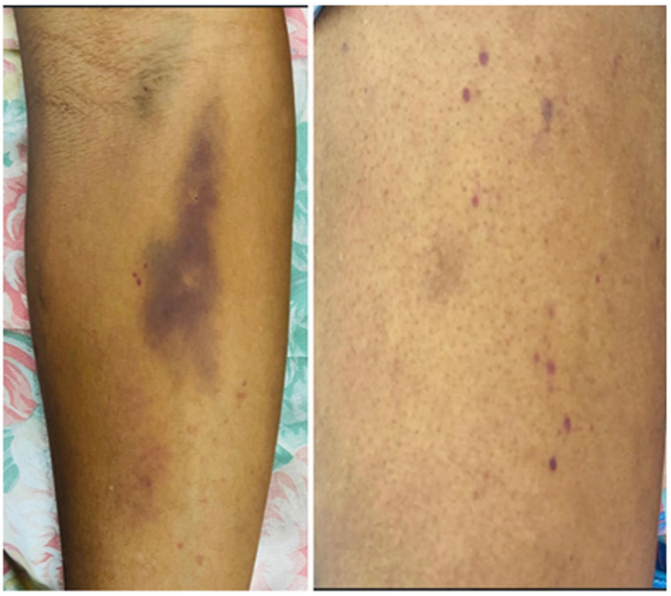
During the study period, 418 leukemia cases met the inclusion criteria, corre-

sponding to an annual frequency of 48.8 cases. The majority of patients were aged between 31 and 45 years, accounting for 23.5% (n = 113). The mean age was 39.90 years, with a range of 1 to 90 years. Males predominated, representing 59.5% (n = 286), while females accounted for 40.5% (n = 195), resulting in a sex ratio of 1.46. The socioeconomic status was moderate in 23.5% (n = 113) of cases.

3.2. Clinical Data

The tumor syndrome was the most common clinical sign, observed in 84.9% (n = 408) of cases, with splenomegaly in 38.5% (n = 184) followed by lymphadenopathy in 26.3% (n = 127). Multiple-site lymphadenopathy was the most frequently reported, accounting for 15.6% (n = 75), followed by axillary lymphadenopathy in 7.7% (n = 37). Stage IV splenomegaly was predominant in 20% (n = 96) of cases. Pale skin and mucous membranes were documented in 32.6% (n = 156). Infectious syndromes with pulmonary involvement were identified in 10.6% (n = 51) of cases.

A hemorrhagic syndrome characterized by bruising (a) and petechial (b) in respectively 30.26% (n = 115) each (Figure 1).



(a) (b)

Figure 1. Hemorrhagic syndrome ((a): Bruise and (b): Petechiae).

3.3. Paraclinical Data

Anemia was reported in 290 patients (60.3%). Leukocytosis was present in 271 patients (57.4%). Thrombocytopenia was documented in 31.6% (n = 152) of cases. Blood immunophenotyping was performed in 287 patients and supported a diagnosis of Acute Lymphoblastic Leukemia (ALL) in 13.5% (n = 65), Acute Myeloid Leukemia (AML) in 23.9% (n = 115), and Chronic Lymphocytic Leukemia (CLL) in 22.3% (n = 107). Molecular biology testing was conducted in 189 pa-

tients and identified the BCR-ABL transcript, confirming Chronic Myeloid Leukemia (CML).

3.4. Confirmed Diagnoses (Figure 2)

Chronic Myeloid Leukemia (CML) was the most frequent leukemia, accounting for 39.3% (n = 189) of cases, including 1 case in blast phase and 12 cases in accelerated phase. Acute Lymphoblastic Leukemia (ALL) was diagnosed in 65/418 cases. Acute Myeloblastic Leukemia (AML) was diagnosed in 115/418 cases.

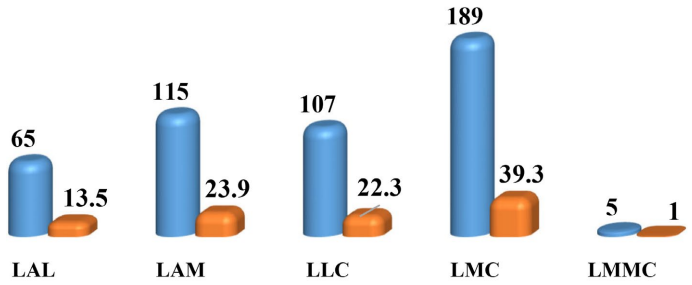


Figure 2. Distribution of patients by leukemia type.

3.5. Therapeutic and Outcome Data

Given economic constraints, the feasible treatment strategies included: the R-CHOP protocol for some cases of CLL, Imatinib for CML cases, MARALL for ALL cases, and subcutaneous cytarabine for AML cases. In addition to symptomatic treatment and intensive care support, CML cases were treated with Imatinib, with a median survival of 250 months (**Figure 3**).

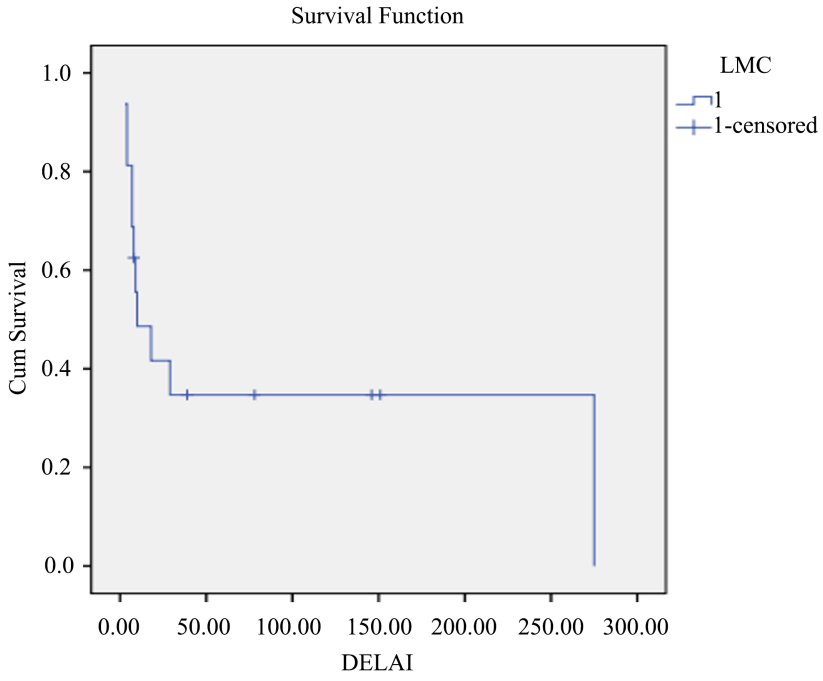


Figure 3. Mean survival of CML cases.

AML cases received only subcutaneous cytarabine, with a mean survival of 4 months (Figure 4).

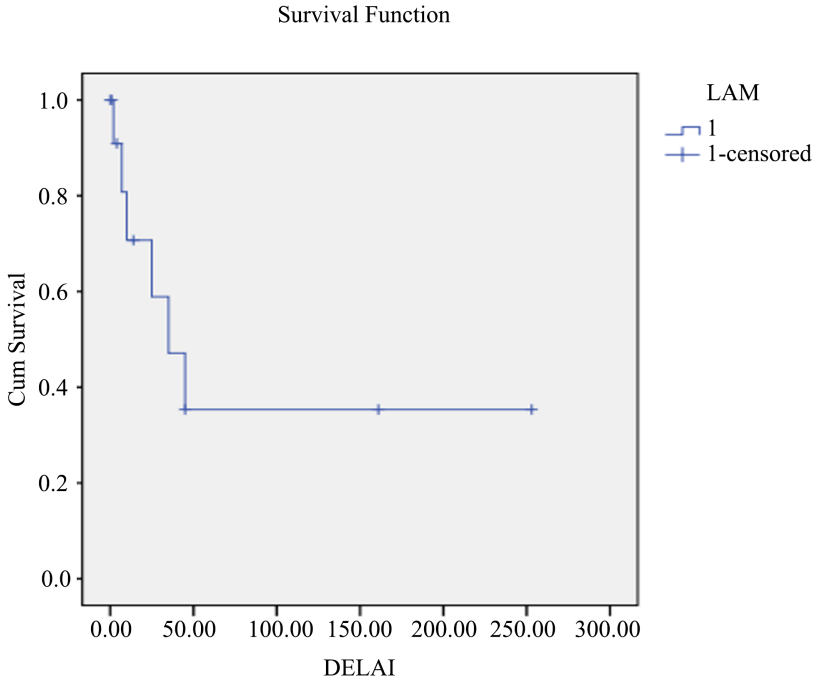


Figure 4. Mean survival of AML cases.

CLL cases were treated with R-CHOP, with a mean survival of 34 months (Figure 5).

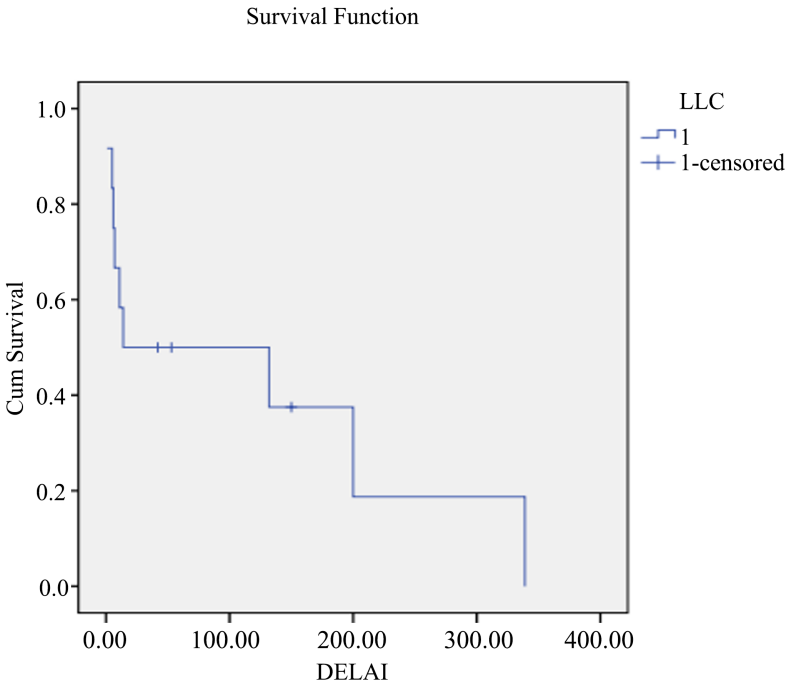


Figure 5. Mean survival of CLL cases.

4. Discussion

4.1. Sociodemographic Data

An annual frequency of 48.8 cases was observed. This is higher than the rates reported by THIAM *et al.* in Dakar, Diallo *et al.* in Mali, and TEA D *et al.* in Côte d'Ivoire, which were 30, 33, and 43.2 cases per year, respectively [7]-[9]. It is also higher than the rate of 9.8 cases per year found by Dicko in Mali [10]. This difference may be explained by the fact that our study included all patients regardless of age. A male predominance was noted, with a sex ratio of 1.46, while Dicko reported a sex ratio of 1.26 [10]. The mean age of our patients was 39.90 years. Messaoudi in Algeria reported an age range of 41 - 50 years [11].

4.2. Clinical Data

The tumor syndrome was the most frequent clinical sign, occurring in 84.9% of cases, with splenomegaly present in 38.5%. Koulidiati *et al.* in Ouagadougou reported splenomegaly and lymphadenopathy in 75% and 28% of their patients, respectively [12]. Similar findings have been observed in other African studies [8] [10] [13] [14]. This may be attributed to socioeconomic challenges and subsequent delays in seeking medical consultation.

4.3. Paraclinical Data

Anemia was reported in 290 patients (60.3%), leukocytosis in 271 patients (57.4%), and thrombocytopenia in 152 cases (31.6%). Similar findings were reported by Ouédraogo RC in Burkina Faso, Plo KJ *et al.* in Côte d'Ivoire, and Mbensa L *et al.* in Kinshasa, Congo [13] [15] [16]. The high prevalence of anemia may be explained by the poor socioeconomic status of our patients, delays in consultation, and particularly by bone marrow infiltration by leukemic cells. Chronic Lymphocytic Leukemia (CLL) ranked third in our series, with 107 cases (22.3%). Nacoulma *et al.* in Ouagadougou reported a frequency of 13%, while Ouédraogo *et al.* in 2011 reported a rate of 17.2% for CLL, both based on cytological examination [15] [17] [18]. Acute Lymphoblastic Leukemia (ALL) was diagnosed in 65/418 cases. Acute Myeloblastic Leukemia (AML) was diagnosed in 115/418 cases. In Niger, Djibrilla-Almoustapha *et al.* in 2024 reported 16.64% cases of Acute Lymphoblastic Leukemia [19].

4.4. Therapeutic and Outcome Data

The median survival for CML cases was 250 months, while it was 4 months for AML cases and 34 months for CLL cases. Koulidiati T *et al.* reported lower survival rates than ours [12]. This difference may be explained by the higher prevalence of CML in our study.

5. Conclusion

Through this study, we observed that the frequency of leukemias has increased significantly at the National Hospital of Niamey and affects a younger population

compared to European studies. However, diagnosing these conditions faces substantial challenges due to limited technical resources. Although leukemias are now considered curable diseases, the prognosis remains poor in developing countries, largely due to late diagnosis and delays or inadequacies in treatment.

Ethical Aspects

This publication complied with ethical and professional standards, in particular the protection of patient identity and their approval regarding the use of images for educational purposes.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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