Plasma Cell Leukemia: A Case Report and Literature Review

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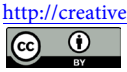

Abstract

Plasma cell leukemia is a rare malignant hemopathy, characterized by a peripheral plasma cell proliferation of more than 20% of the leukocyte formula. A few rare cases have been described. From which we report a case of plasma cell leukemia in a 52-year-old Nigerien subject initially in a coma, whose anemia led to the diagnosis in the Onco-Hematology department of the National Hospital of Niamey and the evolution was marked by clinical and biological remission after 3 cures of CTD, but died in an infectious picture after 6 cures.

Keywords

Plasma Cell Leukemia, Onco-Hematology, HNN, Niamey-Niger

1. Introduction

Plasma cell leukemia is a rare hematologic malignancy, described over a century ago. It can be primary or secondary to multiple myeloma in 2% to 4% of cases. It represents 0.9% of all acute leukemia [1]. According to the literature, the median age of onset is between 52 and 65 years. The clinical presentation is very polymorphic based on the signs of bone marrow failure [2]. The diagnosis is based on a medullary and blood plasma cell proliferation greater than 20% of plasma cells or a number of plasma cells greater than 2 G/L in the circulating blood associated with plasma cell immunophenotyping. Treatment is urgently needed, especially as there is no known effective therapy to date. The prognosis is usually poor due to a very short average lifespan [2] [3]. To our knowledge, no case of acute plasma cell leukemia has been reported in our context. We report the first

case of Acute Plasmocytic leukemia in our context.

2. Case Report

The patient is a 52-year-old male, without a significant past medical history, who was brought to hematology OPD for a profound deterioration of his general status, intermittent bone pain for more than 3 months and skin pallor. The patient had a decreased level of consciousness (GSC 9) with a body mass index of 22 kg/m^2, blood pressure (BP) was at 90/60 mmHg, dehydrated, a febrile (T°: 37.3°C) no palpable peripheral lymphadenopathy, no hepato-splenomegaly, the conjunctivae and mucous membranes were pale without jaundice. The patient was hospitalized in a hematological emergency, after resuscitation, a biological assessment was requested: The complete blood count (CBC) which has shown leukocytosis (WBC: 66.310/mm^3), anemia (Hb: 6.1 g/dl), normocytic (MCV: 97.2 fL) normochromic (MCCH: 31.6%) and thrombocytopenia (Plt: 84,000/mm^3), non-regenerative (Reticulocytes: 45.000/mm^3). The biochemical assessment, a corrected serum calcium level of 5.66 mmol/L, creatinine level: 134 mmol/L, total proteins: 33 g/L, 24-hour proteinuria at 0.78 g/24 h, the LDH level at 453 IU/l, normal transaminases. The blood smear had shown 82% of circulating plasma cells, or 55 G/L, made of large plasma cells, with binucleated and central nuclei (**Figure 1**). A sternum bone marrow aspiration was done, which had showed an infiltration of more than 85% plasma cells, most of which are dystrophic. A peripheral blood plasma cell immunophenotyping was done to determine the etiology revealing: CD38/CD138: 60%, CD19$^+$ (9%), CD20$^+$ (1%), CD56$^+$ (98%), CD117$^+$ (0%), Kappa$^+$ (100%), in favor of a Kappa CD19$^-$ plasma population, expressing the aberrant marker CD56. An electrophoresis of serum proteins was in favor of a monoclonal gammopathy (**Figure 2**). An IgG Kappa was found by Immunofixation (IF). The FISH: 91% of the plasma cells have the trisomy of CKS1B locus at 1q21, 66% of the plasma cells have the deletion of the IGH locus at 14q32. Absence of IGH/FGFR3 rearrangement, no deletion of the P53 locus in 17p1. The spinal X-Ray showed a vertebral lysis of L3 with numerous diffuse gaps and the β_2 microglobulin: 4 U/ml.

Based on clinical data, blood smear, immuno-typing and FISH, the diagnosis is that of Plasma cell leukemia with trisomy of the CKS1B locus in 1q21 and a deletion of the IGH locus in 14q32.

The patient was put on Dexamethasone 40 mg daily for 4 days with a clinical and paraclinical improvement, increased level of consciousness, and a decrease in leukocyte count. Treatment with Cyclophosphamide-Thalidomide-Dexamethasone (CTD) was instituted, with regular follow-up once a month including clinical and biological evaluation (CBC, thick gout, uremia, creatinemia, transaminase, blood smear, LDH and CRP) very limited made of our limited technical platform which led to clinical remission (disappearance of previous complaints) and biological remission with normalization of the CBC (GB: 4350/mm^3, Hb: 12.7 g/dl and plq: 134,000/mm^3), blood smear, EPP (**Figure 3**), with a Glasgow 15/15

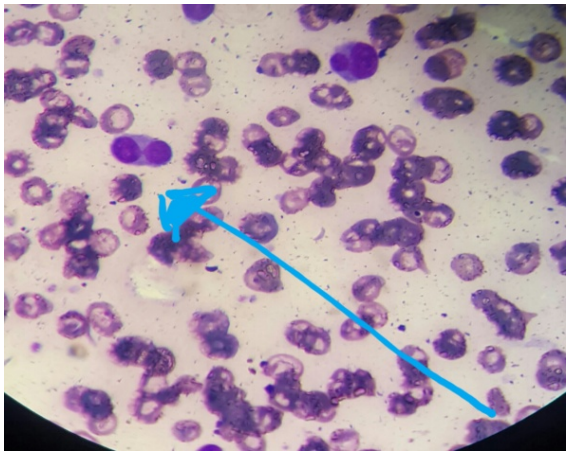

Figure 1. Blood smear plasma cell.

Figure 2. Monoclonal gamma peak.

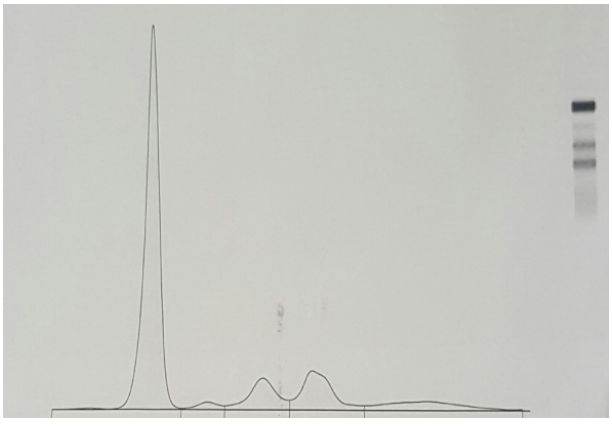

Figure 3. EPP after 3 cures de CTD.

after 3 courses of CTD. Unfortunately, our patient died after 6 cures of CTD (192 days after diagnosis), in an infectious context, severe malaria neurological form.

3. Discussion

Plasma cell leukemia is a malignant plasma cell proliferation of clonal origin. It

is a rare condition, considered to be a leukemic variant of multiple myeloma. It is mainly primary in 60% of cases and secondary in 40% of cases with multiple myeloma. Compared to multiple myeloma, it affects the younger population much more. Given the rarity of this condition, only a few cases have been reported [1]. Our patient is a young male of 52 years.

The clinical manifestations are dominated by signs of spinal cord injury, much more aggressive than that of multiple myeloma with a greater frequency of extra spinal cord injury present in 23% - 100% of cases depending on the series [2]. The case of our patient is rare, revealing no tumor syndrome. The biological diagnosis is based on the complete blood count and the blood smear after staining with May Grunwald Giemsa (MGG) which shows a blood plasmacytosis greater than 2 G/L or a level of circulating plasma cells greater than 20% of the leukocyte count [3] [4]. Plasma cells are sometimes difficult to identify on blood smears and the use of immunophenotyping in ambiguous forms is essential for diagnosis. Leukocytosis ranges from 30 G/L to 87.6 G/L. Normal white blood cell count or leukopenia may be found [5] [6]. Our patient had a leukocytosis at 66.310/mm^3. RBCs and platelets involvement, non-regenerative normochromic normocytic anemia with a hemoglobin level below 10 g/dl and thrombocytopenia are found in 45% - 87.5% of patients [2]. Our patient had anemia with a hemoglobin level at 6.1 g/dL and a thrombocytopenia at 83.000/µl. The myelogram or osteomedullary biopsy shows diffuse plasma cell infiltration varying from 50% - 100%. This plasmocytic population consists of plasma cells with an eccentric nucleus, a strongly basophilic cytoplasm with an archoplasm and large dystrophic plasma cells, with a double, triple or even multiple nuclei and a vacuolated cytoplasm [7]. In our patient's case, the invasion was significant (85%). These plasma cells secrete a complete immunoglobulin or light chains found in 39% of cases with a lambda isotope in 50% of cases. Primary non-secreting plasma cell leukemia has been reported [7]. Our patient's case is a plasma cell leukemia secreting IgG Kappa. Chronic kidney disease is found in 80% - 100% [2]. Hypercalcemia is common with a serum calcium level greater than 2.86 mmol/l (115 mg/l) found in 44% of patients [8]. Our patient is an exception since he has a normal renal function and calcium level. The serum LDH level is higher than 300 IU/l in 63% of cases and higher than 460 IU/L in 48% of the cases [9].

The immunophenotyping of peripheral or medullary plasma cells makes it possible to identify some differences in phenotype without, however, identifying a characteristic profile. Hyperexpression of CD38 and CD138 surface antigens [2] [9] is common. CD28 is present in only 38% of cases [2] [9] and CD56 in less than 20% of cases [2] [10]. A few rare studies have analyzed the expression of adhesion molecules considered to be responsible for the anchoring of plasma cells in the stroma of the bone marrow. In our patient, immunophenotyping was performed and revealed an aberrant secretion of CD56.

The genetic anomalies found [2] [9] are non-specific but certain observations are worth mentioning such as the loss of chromosome material from the long

arm of chromosome 13 (80% of cases) and chromosome 16 (80% of cases), the high frequency of translocation t (11; 14) (ql3; q32) (33% of cases) and the rarity of hyperdiploides.

The most common molecular anomalies are the amplification and hyper-expression of the c-myc oncogene (in 2/3 of cases), mutations in the p53 gene [11], hyper-expression of MDM2 (murine double minute 2) [12], hypermethylation of the P16 gene [12] and mutations in the K-Ras and N-Ras genes [13] found in 30% to 50% of cases.

The hematological karyotype was carried out in our case and found a trisomy of the CKS1B locus in 1q21, 66% of the plasma cells show deletion of the IGH locus in 14q32. Absence of IGH/FGFR3 rearrangement, no deletion of the P53 locus in 17p1.

In addition to molecular anomalies, several molecules are secreted by the spinal cord and the microenvironment and are involved in plasma cell proliferation such as lectin, interleukin 3 and 6, VEGF (vascular endothelial growth factor) and IGF 1 (insulin growth factor 1). The prognosis is very poor [2] [14], the median overall survival would be 7 months [1]. Poor prognostic factors (b2 microglobulin, plasma cells in phase S, impaired renal function, calcium and serum LDH levels) are often found [9]. The clinical and paraclinical evolution is favorable in our patient after 3 courses of CTD.

4. Conclusion

Plasma cell leukemia is a rare malignant hemopathy. It differs from other plasma cell hemopathies by its occurrence in young people and its poor prognosis. Innovative therapeutic trials with thalidomide analogues and proteasome inhibitors have been shown to be effective.

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Author Contributions

Malam Abdou Badé was largely contributed to the realization of this work, passing by the diagnosis of the therapeutic decision and the writing of the work.

Djibriila Almoustapha Amadou contributed to the patient but also the development of the body of this work which has undergone several corrections by the authors.

Conflicts of Interest

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

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