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(CASE REPORT)

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Secondary plasma cell leukemia: Case report

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Abstract

Plasma cell leukemia (PCL) is a rare lymphoproliferative disorder characterized by monoclonal proliferation of plasma cells in marrow and peripheral blood. It is defined by a blood plasma count greater than 2 G/l or a plasma cell count greater than 20% of white blood cells. There are two forms of PCL: primary PCL (primary plasma cell leukemia or PCL-P), which occurs de novo and is diagnosed by blood dissemination, and secondary PCL (secondary plasma cell leukemia or SPL), which is the result of the evolution of multiple myeloma (MM). We report an observation of secondary plasma cell leukemia in a 42-year-old female patient diagnosed at the hematology laboratory of the Mohamed VI University Hospital in Marrakech. The patient was being followed up for chronic end-stage renal failure in whom the etiological assessment of a hypercalcemia of fortuitous discovery revealed MM for which she was put on chemotherapy according to the Velcade-Thalidomide-Dexamethasone protocol with a good evolution after 6 courses. Two and a half years later, the patient presented with anemia and spinal pain. The biological work-up showed a normocytic normochromic anemia at 5.4 g/dl and hypercalcemia at 150 mg/l. The blood smear showed the presence of 22% of circulating plasma cells, the majority of which were dystrophic, in favor of secondary plasma cell leukemia.

Patients diagnosed with multiple myeloma who have undergone treatment and have a stable disease should have regular surveillance, hence the interest of the blood smear examination in all multiple myeloma.

Keywords: Plasma cell leukemia; Multiple myeloma; Regular surveillance; Blood smear examination

1. Introduction

Plasma cell leukemia (PCL) is a rare lymphoproliferative disorder characterized by monoclonal proliferation of plasma cells in marrow and peripheral blood. It is defined by a blood plasma count greater than 2 G/l or a plasma cell count greater than 20% of white blood cells. There are two forms: the primary form, which occurs de novo (primary plasma cell leukemia or PCL-P) and is diagnosed by blood dissemination, and the secondary PCL, which is the result of the evolution of a multiple myeloma (MM) (secondary plasma cell leukemia or PCL-S). The incidence of PCL represents about 2-4% of plasma cell malignancies, of which primary PCL (pPCL) constitutes the majority of cases (60-70%). However, with an increase in the survival rate of myeloma patients, secondary PCL (sPCL) is becoming more common [1, 2]. Similar to myeloma, pPCL is also more common in African Americans [3]. PPCL tends to present at a younger age than sPCL. pPCL and sPCL are distinct entities, but both have a poor prognosis. Median overall survival is 6 to 11 months for sPCL occurring in the setting of relapsed or refractory myeloma with poorer outcomes. The male-female distribution in pPCL and secondary sPCL is approximately 3: 2 [1]. Given the rarity of this disease, the criteria for diagnosis and treatment are still under investigation.

The aim of this work is to recall the interest of the blood smear in the diagnosis of secondary plasma cell leukemia while reporting an observation of secondary plasma cell leukemia.

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2. Observation

This is a 42-year-old patient with a history of chronic end-stage renal failure at the stage of hemodialysis at a rate of two sessions per week, referred by her nephrologist in October 2017 in the face of the fortuitous discovery of hypercalcemia and whose etiological workup to suspect a MM.

On clinical examination the patient was apyretic and presented with mucocutaneous pallor with notion of bone pain. There was no tumor, hemorrhagic or infectious syndrome.

The biological workup revealed a normocytic normochromic anemia with an aregenerative count of 6.9 g/dl without thrombocytopenia and a normal leukocyte count of 7.24 G/l.

The myelogram showed a rich marrow invaded by 35% of dystrophic plasma cells.

Biochemical findings included hypercalcemia at 107.14 mg/l, renal failure with urea at 0.61 g/l and creatinine at 48.3 mg/l (creatinine clearance evaluated at 12 mL/min according to MDRD) and an inflammatory profile on serum protein electrophoresis with protidemia at 73 g/l.

Urinary protein electrophoresis showed abundant proteinuria at 4.45 g/l, composed essentially of globulin with two monoclonal peaks in the gamma zone. Immunofixation confirmed the presence of an IgG type immunoglobulin with kappa light chains.

In addition, there was a massive presence of Bence Jences Kappa proteinuria, with various degrees of polymerization in favor of a lambda light chain myeloma.

Therapeutically, the patient received chemotherapy according to the Velcade-Thalidomide-Dexamethasone protocol with monthly injections of biphosphonates, combined with symptomatic treatment (forced diuresis, analgesics and transfusion support). The evolution was marked by a very good response after 6 treatments. Two and a half years later, the patient presented with an anemic syndrome and spinal pain with skin and mucous membrane pallor and paraplegia of the lower limbs on clinical examination.

The biological work-up showed a normocytic normochromic anemia at 5.4 g/dl and hypercalcemia at 150 mg/l.

The blood smear showed the presence of 22% of circulating plasma cells, mostly dystrophic, in favor of secondary plasma cell leukemia. The myelogram confirmed the diagnosis showing 96% invasion by plasma cells sometimes binucleated.

3. Discussion

PCL is a rare and aggressive condition that can be either a primary proliferation of plasma cells or a secondary leukemic transformation of a previously diagnosed MM [4].

Although PCL is defined by a blood plasma count greater than 2 G/l or a plasma cell count greater than 20% of leukocytes, recent studies have advocated the use of a lower threshold of CPC to define PCL [3-5].

Immunophenotypic expression is similar in PCL and MM for CD 38, CD 138 and CD 2, CD 3, CD 16, CD 10, CD 13, and CD 15. PCL, however, are more likely to express CD 20, CD23, CD 44, CD 45 and not express CD 56, CD 9, CD 71, CD 117. Primary and secondary PCL share a similar immunophenotype with the exception of CD 28, which is expressed with greater frequency in sPCL. CD 28 is a poor prognostic factor in MM and is associated with plasma cell proliferation, disease progression and resistance to chemotherapy [6, 7, 8, 9].

PCL cells are more often non-hyperploid as in MM. pPCL is typically positive for t (11; 14); although this can also be seen in sPCL, it is more frequently associated with t (4; 14) and t (14; 16) [10].

Typically sPCL is developed in association with translocations of the immunoglobulin heavy chain (IgH) translocation with other chromosomal partners (4p16, 6p21, 11q13, 16q23 and 20q11) with or without associated mutation/deletion [6].

A higher incidence of t (11; 14) (q13; q32) and other chromosomal abnormalities, such as Del (17p13), Del (1p21), ampl (1p21), t (14; 12) and t (4:14)), have also been reported [11].

As in our patient, sPCL occurs due to the dissemination of tumor cells into the peripheral bloodstream from the bone marrow, causing the resulting leukemic transformation. It occurs due to a change in the expression of adhesion molecules and chemokine receptors and due to several molecular aberrations.

Like other leukemias, PCL may also present with overt clinical signs such as hepatosplenomegaly and lymphadenopathy, but this is uncommon and occurs in only 15% of patients [2]. The presence of plasma cells can be confirmed by flow cytometry positivity for markers as described above, particularly CD 38 and CD 138.

PCL is often resistant to many agents as it can often be a terminal manifestation of a myeloma patient who has received multiple lines of therapy. Because PCL is a rare entity, there is no consensus regarding its treatment. Combination chemotherapy, particularly with proteasome inhibitors and immunomodulatory drugs, followed by stem cell transplantation, is currently the standard treatment.

Recommendations for the therapeutic approach to PCL are to initiate induction chemotherapy with a triplet regimen containing a new agent such as VRd (bortezomib, lenalidomide, dexamethasone) or KRd (carfilzomib, lenalidomide, dexamethasone).

Consolidation with autologous stem cell transplantation (ASCT) is recommended as post-induction therapy. Allogeneic stem cell transplants have been shown to be inferior to ASCT; they have a higher mortality rate and should be performed in clinical trials.

As with many oncologic conditions, treatment must be tailored to the patient's profile. Patients with PCL should be considered for new treatment options, and trials and collaboration are important in the development of new treatment modalities [12, 13].

4. Conclusion

Plasma cell leukemia is a rare entity requiring early recognition for better treatment outcome. Patients diagnosed with multiple myeloma who have under-gone treatment and have stable disease should have regular surveillance, hence the importance of blood smear examination in all multiple myeloma.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare no conflicts of interest.

Contributions of the authors

All authors contributed to the conduct of this work. All authors also declare that they have read and approved the final version of the manuscript.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors'.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Tiedemann RE, Gonzalez-Paz N, Kyle RA, et al. Genetic aberrations and survival in plasma cell leukemia. Leukemia. 2008, 22:1044-1052

[2] Bladé J, Kyle RA. Nonsecretory myeloma, immunoglobulin D myeloma, and plasma cell leukemia. Hematol Oncol Clin North Am. 1999, 13:1259-1272.

[3] Ramsingh G, Mehan P, Luo J, et al. Primary plasma cell leukemia: A Surveillance, Epidemiology, and End Results database analysis between 1973 and 2004. Cancer. 2009, 115:5734-5739.

[4] Noel P, Kyle RA. Plasma cell leukemia: evaluation of response to treatment. Am J Med. 1987, 83:1062-1068.

[5] Eddou H, Mahtat el M, Zahid H, et al. Plasma cell leukemia: three case reports and review of the literature. Ann Biol Clin (Paris) 2013, 71:698-702.

[6] Bommannan K, Sachdeva MU, Malhotra P, et al. Plasma cell leukemia in North India: retrospective analysis of a distinct clinicohematological entity from a tertiary care center and review of literature. Blood Res. 2016, 51:23-30.

[7] Naseem S, Kaur S, Gupta R, et al. Plasma cell leukemia: case series from a tertiary center with review of literature. Indian J Hematol Blood Transfus. 2012, 28:10-14.

[8] CD28-mediated pro-survival signaling induces chemotherapeutic resistance in multiple myeloma. Murray ME, Gavile CM, Nair JR, et al. Blood. 2014, 123:3770-3779. [Free PMC article] [PubMed] [Google Scholar].

[9] Absence of CD56 (NCAM) on malignant plasma cells is a feature of plasma cell leukemia and a particular subset of multiple myeloma. Pellat-Deceunynck C, Barillé S, Jego G, et al. Leukemia. 1998, 12:1977-1982. [PubMed] [Google Scholar]

[10] Plasma cell leukemia: an update on biology and therapy. Mina R, D'Agostino M, Cerrato C, Gay F, Palumbo A. Leuk Lymphoma. 2017, 58:1538-1547. [PubMed] [Google Scholar]

[11] Primary plasma cell leukemia: clinical, immunophenotypic, DNA ploidy and cytogenetic features. García-Sanz R, Orfão A, González M, et al. https://pubmed.ncbi.nlm.nih.gov/9920853/ Blood. 1999, 93:1032-1037. [PubMed] [Google Scholar]

[12] How I treat plasma cell leukemia. van de Donk NW, Lokhorst HM, Anderson KC, Richardson PG. Blood. 2012, 120:2376-2389. [Free PMC article] [PubMed] [Google Scholar]

[13] Immunophenotypic characteristics by flow cytometry of 36 cases of plasma cell leukemia. Kraj M, Kopeć-Szlęzak J, Pogłód R, Kruk B. Leuk Res. 2011, 35:169-176. [PubMed] [Google Scholar]