

Primary plasma cell leukemia: evaluation of a rare disease

Primer Plazma Hücreli Lösemi: Nadir Bir Hastalığın Değerlendirilmesi

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Abstract

Plasma cell leukemia (PCL) is a rare and aggressive cancer involving plasma cells. There are two forms of PCL (with or without multiple myeloma). Although patients with primary and secondary PCL share several clinical features, important differences exist. We report on a case diagnosed with primary PCL. We analyzed the clinicopathologic and laboratory features of the disease. The aim of this report is to draw attention to PCL.

Keywords: Plasma cell, primary plasma cell leukemia, multiple myeloma

Öz

Plazma hücreli lösemi (PHL), plazma hücrelerini içeren agresif ve nadir görülen bir kanserdir. PHL, multiple myelomanın birlikte olduğu ve olmadığı şekilde iki formu (primer, seconder) bulunmaktadır. Primer ve seconder PHL'li olguların birçok klinik özellikleri benzer olsada önemli farklılıklar bulunmaktadır. Bu olgu sunumunda primer PHL'li bir hastanın klinik, patolojik ve laboratuvar bulguları incelenmiştir. Bu olgu sunumunun amacı PHL'e dikkat çekmektir.

Anahtar Kelimeler: Plazma hücresi, primer plazma hücreli lösemi, multiple myeloma diskoid

Introduction:

Plasma cell leukemia (PCL) is a rare cancer involving plasma cells. The primary (pPCL) form occur in patients without preceding multiple myeloma (MM) or monoclonal gammopathy of undetermined significance, and the secondary (sPCL) form arising as a leukemic transformation

of MM. The incidence of pPCL ranges less than 5% of malignant plasma cell (PC) diseases (1). The diagnostic criteria is based on the presence of more than 20% of plasma cells in the peripheral blood or an absolute number of plasma cells exceeding $2 \times 10^9 / L$ (2). There are some differences in clinical signs of primary and the secondary PCL. PCL is usually

progressive. For the patients previously received alkylating agents and became resistant to them develops, secondary PCL rarely responds to chemotherapy.

Due to the low frequency of this entity, most publications on PCL are based on case report, a few series with more than 20 patients can be found in the literature (1,3). We have analyzed clinic and laboratory characteristics of a case diagnosed with primary (de novo) PCL.

Case report

The 74-year-old male patient admitted to our hospital with complaints of anemia. General physical examination was unremarkable except for pallor. The outstanding laboratory findings were as follows: hemoglobin 8.7 g/dL, leukocyte count $10.33 \times 10^3/uL$, platelet count $56 \times 10^3/uL$, blood urea nitrogen 38 mg/dL, serum creatinine 2.2 mg/dL, uric acid 14.4 mg/dL, serum calcium 10 mg/dL, albumin 4.2g/dL, lactate dehydrogenase (LDH) 280 u/L and the erythrocyte sedimentation rate 32 mm/h. He didn't have any organomegaly. Skeletal survey demonstrated few lytic bone lesions by X-ray in the skull. As shown in Figure 1, bone marrow examination showed nearly 80% of plasma cell constitution. Serum protein electrophoresis showed a suspected monoklonal spike in gamaglobulin fraction. As shown in Figure 2, in immunfixation electrophoresis, free kappa chain was detected. Immunohistochemical examination of bone marrow showed diffuse staining with CD20, CD38, CD117 and kappa was positive. In immunophenotypic examination of bone marrow 55% CD38, 55% CD138, 55% CD19, 55% CD117 positive and kappa monoclonality in CD45 negative blast cells was observed. However, CD56 expression was not found. Based on overall

findings, the diagnosis was pPCL in light chain.

Discussion

The pPCL is a rare and aggressive subtype of PC dyscrasia. Primary PCL has been reported to be associated with prior exposure to chemotherapy or radiotherapy. But, this association is difficult to confirm due to low incidence (4). Secondary PCL develops from a preexisting plasma cell dyscrasia. Most clinical signs of myeloma are observed in PCL. In previously reported series, patients with pPCL have often extra osseous organ involvement, thrombocytopenia, increased frequency of renal failure and lactate dehydrogenase and rapid progression to the terminal stage. Lytic bone lesions are less (1,3,5,6). Anemia occurs more frequently in cases with PCL versus cases with MM (6). The clinical data observed in our case are concordant with previous report and bone marrow examination showed nearly 80% of plasma cell constitution. In medical history of our patient has not a preexisting plasma cell dyscrasia.

Flow cytometry (FC) is an important diagnostic tool for the evaluation of peripheral blood and bone marrow. PCs from PCL displayed a more immature phenotype than MM as assessed by the expression of the CD20 antigen, which is usually absent in MM. In addition, the immunophenotype of plasma cell leukemia differs typically from that of myeloma by lack of aberrant CD56 expression (6). However, the phenotypic differences do not allow a complete discrimination between PCL and MM. The phenotypic characteristics could help to explain the differences in survival. CD56 antigen expression has been associated with a good prognosis (7) and the CD20 antigen has been associated with a shorter survival (8). Co-expression of CD38 and CD138 was best combination to identify the PC by FC (9). In immunophenotyping of plasma cells in our patient

was compatible with these literature findings and as we detected 55% CD38, 55% CD138, 55% CD19, 55% CD117 positive expression and kappa monoclonality in CD45 negative blast cells. However, CD56 expression was not found. Immunohistochemical examination of bone marrow showed diffuse staining with CD20, CD38, CD117 and kappa was positive.

Both forms affect patients most commonly in the 6th decade of life and are usually progressive, especially in the primer. Patient's survival by more intensive chemotherapy is about 20 months (1).

The outcome of pPCL has improved with novel agents, including bortezomib and immunomodulatory. Bortezomib is probably the most important drug in pPCL because bortezomib-based therapy rapidly reduces tumor load and reverses complications, including renal failure (10). Our patient was initiated bortezomib combined with dexamethasone. He is in his eighth cure of treatment and the patient's general condition is good.

As the case showed a typical presentation for pPCL and a rare, aggressive type of cancer, we wanted to report the case.

References

- 1- Dimopoulos MA, Palumbo A, Delasalle KB, Alexanian R. Primary plasma cell leukemia. *Br J Haematol* 1994; 44: 754-9.
- 2- Kyle RA, Maldonado JE, Bayrd ED. Plasma cell leukemia. Report on 17 cases. *Arch Intern Med* 1974; 133: 813-8.
- 3- Garcia-Sanz R, Orfao A, Gonzalez M, Taberero MD, Blade J, Moro MJ et al. Primary plasma cell leukemia: Clinical, immunophenotypic, DNA ploidy, and cytogenetic characteristics. *Blood* 1999; 93: 1032-37.
- 4- Candoni A, Tiribelli M, Fanin R. Plasma cell leukemia occurring in a patient with thrombocytopenia treated with hydroxyurea and busulphan. *Leuk Lymph* 2004; 45: 821-824.
- 5- Jain D, Singh T, Akhila L, Ghosh N. Primary plasma cell leukemia in a 30-year-old woman. *Indian J Pathol Microbiol* 2008; 51: 456-7.
- 6- Van de Donk NWCJ, Lokhorst HM, Anderson KC, Richardson PG. How I treat plasma cell leukemia. *Blood* 2012; 120: 2376-89.
- 7- Van Camp B, Durie BGM, Spier C, De Waele M, Van Riet I, Vela E et al. Plasma cells in multiple myeloma Express a natural killer cell-associated antigen: CD56 (NKH-1, Leu-19). *Blood* 1990; 76:377.
- 8- San Miguel JF, Gonzalez M, Gascon A, Moro MJ, Hernandez JM, Ortega F et al. Immunophenotype heterogeneity of multiple myeloma: Influence on the biology and clinical course of the disease. *Br J Haematol* 1991; 77: 185.
- 9- Tembhare PR, Subramanian PG, Sehgal K, Yajamanam B, Kumar A, Gadge V et al. Immunophenotypic profile of plasma cell leukemia: a retrospective study in a reference cancer center in India and review of literature. *Indian J Pathol Microbiol* 2011; 54: 294-8.
- 10- Goyal M, Mohammad N, Palanki SD, Vaniawala SN. Primary plasma cell leukemia with light chain secretion and multiple chromosomal abnormalities: how successfully treated? A case report with review of literature. *Indian J Med Paediatr Oncol* 2010; 31: 96-100.