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Primary plasma cell leukemia with unusual morphology and complex karyotype

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A 58-year-old woman was hospitalized because of weakness, edema of the extremities and ascites. Physical examination revealed pallor and liver enlargement. Biological findings were as follows: hemoglobin 9.3 g/dL, leukocyte count 72.8×10^9/L, with 85% atypical cells, platelet count 131×10^9/L, increased lactic dehydrogenase (780 U/L) and β2-microglobulin (16.9 mg/L). Serum protein electrophoresis revealed severe hypogammaglobulinemia, and monoclonal kappa light chain (800 mg/dL) was found in the urine. No liver or kidney dysfunction was detected by serum biochemical determinations and no abnormalities were seen on the X-ray study.

Bone marrow aspirate smears revealed almost complete replacement of the bone marrow by a diffuse infiltration of cells showing similar features to those observed in the peripheral blood smears. Many of these cells were large, with abundant, moderately basophilic cytoplasm, and contained two to three distinct nuclear lobes. Other cells had cleaved nuclei, giving them a monocytoid appearance. The nuclei with lobulation were often of different size and occasionally had prominent nucleoli (Figure 1). Neoplastic cells were peroxidase, PAS and Sudan negative, and acid phosphatase positive, with the reactivity distributed in granules in the cytoplasm. A massive infiltration of cells with cleaved nuclei was also noted in the sinusoids of a liver biopsy that was performed to exclude hepatic disease as being the origin of the ascites (Figure 2). Flow cytometry of bone marrow cells showed an intense reactivity with CD38 and CD13 antibodies and the presence of cytoplasmatic κ light chains. The stem cell antigen CD34, and the myelomonocytic antigens CD33, CD14 and CD15 were negative.

Plasma cell leukemia has been defined as a clonal proliferation in which the number of plasma cells in the blood is greater than 20 percent of the total leukocytes or the absolute plasma cell count exceeds 2×10^9/L.[1] The neoplastic cells in most cases closely resemble normal plasma cells, although sometimes plasma cell leukemia with aberrant morphologic features (cleaved, monocytoid or multilobated nuclei) has been reported.[2-4] These morphologic characteristics seem to be related to a worse prognosis than the usual well-differentiated myeloma and give rise to a differential diagnosis of myeloid or monocytic leukemia, lymphoma or nonhematologic malignancy.[2,5,6] Although the expression of CD13 and CD33 antigens on normal plasma cells has been reported, the presence of the myeloid antigen CD13 on myeloma cells is an uncommon finding. Since CD13 antigen is expressed by cells of the granulocytic and monocytic lineages, its presence on plasma cells supports the hypothesis of an early stem cell disorder in the development of PCL.[7] Morphological features of the atypical cells in this patient initially suggested undifferentiated blast cells rather than plasmablast

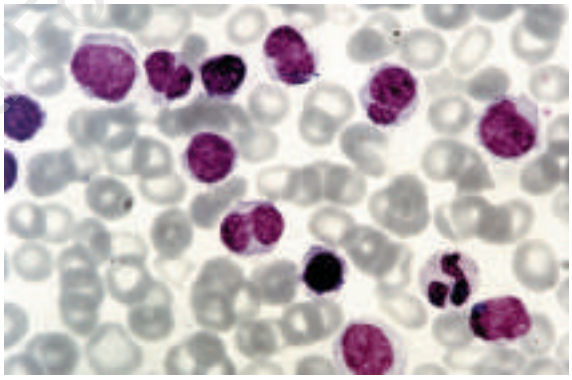

Figure 1. Bone marrow aspirate smear showing blasts cells with cleaved and multilobated nuclei (May-Grünwald-Giemsa, original magnification ×1200).

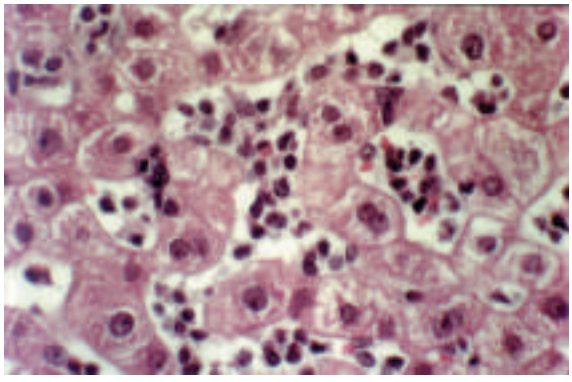

Figure 2. Liver biopsy with sinusoidal infiltrate of monocytoid cells (Hematoxylin-eosin, original magnification ×400).

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or typical plasma cells, however the immunophenotype findings allowed us to make the final diagnosis of plasma cell leukemia.

The cytogenetic study performed on bone marrow cells showed an abnormal cellular clone with complex karyotype in all 26 mitoses examined: 46,XX, del(1)(q21), +der(1), -5,-8,t(12;?) (q22;?), -14, add(14)(q32), +3mar. Although these abnormalities are not specific to PCL, abnormalities of chromosome 14, primarily 14q+, are present in 50% of the patients suffering the PCL with abnormal karyotype.[8] Besides, duplications and deletions of chromosomes 1 and 8 are also commonly involved in PCL. Therefore, karyotype findings were very useful in order to confirm this patient's diagnosis.

The patient was treated monthly with VAD (vincristine, doxorubicin and dexamethasone) cycles. After receiving two cycles both clinical and biochemical data improved but the patient suddenly died from cerebral hemorrhage. We conclude that recognition of aberrant features of plasma cells is helpful in the differential diagnosis of plasma cell leukemia and myeloma from other hematopoietic neoplasms and occasionally from metastatic tumors.

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