Primary non-secretory plasma cell leukemia with atypical morphology – a case report

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Abstract Only one case of primary non-secretory plasma cell leukemia with atypical morphology has been reported thus far. Here we report another such case of plasma cell leukemia diagnosed on flow cytometry, as morphological heterogeneity and lack of monoclonal immunoglobulins in both serum and urine, made it difficult to come to a conclusive diagnosis based purely on morphology.

Keywords Plasma cell leukemia · Multiple myeloma · Flow cytometry · Electrophoresis

Introduction

Plasma cell leukemia (PCL) is a rare and aggressive variant of multiple myeloma with poor prognosis characterized by peripheral blood involvement. The exact incidence of primary plasma cell leukemia is believed to be less than 1 case/million [1]. In certain PCL cases, the leukemic cells are more difficult to identify without electron microscope [2] or immunohistochemical/immunophenotypic studies. The diagnosis may be made difficult further by the non-secretory nature of plasma cell leukemia. Only 1 case of primary non secretory plasma cell leukemia with atypical morphology has been reported [3]. Here, we report another case of primary non-secretory plasma cell leukemia with atypical morphology.

Case report

A 60-year-old lady presented with weakness and low back-ache for 2 months. Physical examination revealed no abnormality, other than bony tenderness in the back.

Blood counts were - Hb: 11.5 g/dl, TLC: 38,800/ μ l with 57% atypical lymphoid cells and platelets: 2,50,000/ μ l. Other abnormal laboratory findings were raised ESR (65 mm at the end of first hour), increased lactic dehydrogenase (650U/L) and β_2 microglobulin (16.4 mg/l). No liver or kidney dysfunction was detected by serum biochemical determinations. Magnetic resonance imaging revealed partial compression collapse of D₉ vertebra.

Bone marrow showed 58% small to medium sized atypical lymphoid cells with a heterogenous morphology. Few of them had bipolar distribution of cytoplasm, and some had a lympho-plasmacytoid appearance (Figs. 1 and 2). Few large abnormal cells were also seen. The possibility of infiltration by a lympho-plasmacytoid lymphoma with spill into peripheral blood was thought of based on morphology.

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However, serum protein electrophoresis (SPE), urine protein electrophoresis (UPE) and immunofixation electrophoresis (IFE) showed no monoclonal proteins.

Flowcytometric immunophenotyping of peripheral blood cells was suggested to confirm the diagnosis. Flowcytometric analysis was performed on Beckman Coulter EPICS XL instrument. Surprisingly, the analysis disclosed that the abnormal cells were plasma cells. 60% of the cells were moderately bright for CD38 with absence of CD45, CD19, CD20, CD10, CD56 & surface κ/λ , hence ruling out infiltration by a lymphoma (Fig. 3).

Based on flow cytometry, SPE, UPE and IFE, a diagnosis of a primary non-secretory plasma cell leukemia with atypical morphology was made.

Discussion

Morphological heterogeneity, including various immature features, in atypical plasma cell leukemias sometimes

makes the diagnosis of PCL difficult and may require an immunohistochemistry or electron microscopic examination to establish a definitive diagnosis [2]. The diagnosis may be made difficult further by the non-secretory (absence of M component) nature of the PCL [4].

Only one case of PNSPCL with atypical morphology has been reported so far [3]. Absence of a monoclonal protein in the serum and urine of patients with non-secretory PCL may be a result of (i) an inability to excrete immunoglobulin (non-secretors) (ii) low synthetic capacity for immunoglobulin (non-producers) (iii) increased intracellular degradation, or (iv) rapid extracellular degradation of abnormal immunoglobulins [5].

The molecular basis of non-secretory myeloma could be due to loss of light chain production (in non-producers) [6] or mutations that causes absence of cysteines required for disulfide bonds. This results in abnormal misfolded light chains, which get retained in the plasma cells due to misfolding and are lysed.

Fig. 1 Atypical plasma cells with bipolar projections

Fig. 2 Morphological heterogeneity with abnormal lymphoid and lympho-plasmacytoid cells

Fig. 3 Flow cytometry scattergrams showing bright surface CD 38 positivity and negativity for CD 45, CD 56, CD 19, CD10, CD 20 and surface κ/λ

In the present case, most of the cells exhibited an atypical morphology which made it difficult to reach a definitive diagnosis. Some cases of primary plasma cell leukemias with atypical morphological features (cleaved, monocytoid or multilobated nuclei) [7], hairy cell morphology [2, 8] and lympho-plasmacytoid morphology, have been reported, however these were secretory in nature. These morphological characteristics seem to be related to a worse prognosis than the usual well-differentiated myeloma [7]. Also in our case, the cells were non-secretory in nature, which is again a rarity, as very few cases of primary non-secretory PCL have been reported [4].

Considerable overlap of immunophenotypic markers exists between multiple myeloma and plasma cell leukemia. However, significant differences in antigen expression have been identified which help to differentiate the two variants. Plasma cells in PCL frequently display a more immature phenotype. Immunophenotypically, plasma cells in PCL show the following pattern: CD38+, CD138+, CD79a+, cytoplasmic Ig+, CD20-/+, CD19 -, CD45-, CD 56-, surface Ig- [9]. Expression of pan-B cell antigen CD20 has been shown in 50% of PCL cases compared to 17% of multiple myeloma cases. In addition, neoplastic cells in marrow and peripheral blood in PCL typically do not express CD56, which is considered to have an important role in anchoring plasma cells to bone marrow stroma.

Our final diagnosis was made on flow cytometric immunophenotyping that showed the cells to be bright surface CD38 positive and negative for CD45, CD19, CD20, CD10, CD56 and surface κ/λ .

Accurate diagnosis of primary PCL is essential, as it is an aggressive disease with a short median survival of 2–6 months [10], with poor response to chemotherapy.

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