Nonconventional morphology in plasma cell leukemia

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Received: 1 November 2018 / Accepted: 6 November 2018 / Published online: 13 November 2018
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Abstract

Plasma cell leukemia is a rare malignancy with a poor outcome. Nonconventional morphology of circulating plasma cells is rare, but few case reports do exist. We present such a case that emphasizes the importance of integrating flow cytometric immunophenotyping to confirm the diagnosis.

Keywords Plasma cell leukemia · Nonconventional morphology

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A peripheral blood (PB) smear from a 68-year-old female was sent in for review of circulating atypical cells. The patient's past medical history includes plasma cell myeloma (PCM) with a 17p deletion status post-multidrug chemotherapy, ionizing radiation for lytic bone lesions, and an autologous peripheral blood stem cell transplant with melphalan conditioning chemotherapy 2 years ago with subsequent disease relapse.

Manual differential of the PB smear revealed 37% of the leukocytes were large mononuclear cells with high N:C ratios, centrally located nuclei with condensed chromatin, prominent nucleoli, and moderate basophilic, vaguely granular cytoplasm (Fig. 1a). Rare forms showed peripheral chromatin clumping and subtle perinuclear cytoplasmic clearing suggestive of plasma cells (Fig. 1b). The morphologic findings were

concerning for, but not entirely diagnostic of, plasma cell leukemia (PCL) with plasmablastic features. However, given the prior exposure to ionizing radiation and alkylating agents, a therapy-related myeloid neoplasm with circulating myeloblasts/monoblasts could not be confidently excluded (Fig. 1c). Flow cytometry was performed and revealed a large population of CD38/CD138-positive, lambda light chain-restricted plasma cells (Fig. 1d and e), confirming the diagnosis of PCL.

PCL is a rare malignancy with a poor outcome. It is defined as clonal plasma cells comprising >20% of total peripheral blood leukocytes or absolute plasma cell count $>2.0 \times 10^9/L$. It may arise as a new leukemia at initial diagnosis (primary PCL) or evolve from a pre-existing PCM (secondary PCL), as in our case. The majority of PCLs are primary, as only approximately 1% of PCMs will transform to secondary PCL. Nonconventional morphology of circulating plasma cells is rare, but few case reports do exist. In these scenarios, and as is presented in this case, appropriate immunophenotypic characterization by flow cytometry must be demonstrated to confirm the diagnosis. High-risk genetic profiles, as seen in this patient, are more common in PCL than in PCM. Response to therapy and survival is typically poor, with median survival ranging from 6 to 12 months [1].

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Fig. 1 Peripheral blood smear showing large mononuclear cells with high N:C ratios (a), with occasional forms that exhibit peripheral chromatin clumping and subtle perinuclear cytoplasmic clearing (b) and others with

a vague monoblastic/promonocytic-like appearance (c). Flow cytometry confirmed that these cells were CD38/CD138-positive, lambda light chain-restricted plasma cells (d, e)

Compliance with ethical standards

Conflicts of interest The authors declare that they have no conflict of interest.

References

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