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AML-MRC with Basophilia Mimicking CLPD Due to Abnormally Clumped Chromatin

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A 49-year-old man sought medical attention with a 1-month history of fatigue and intermittent fever. He manifested no hepatosplenomegaly and no lymph node enlargement. Laboratory studies were remarkable for leukocytosis, anemia and thrombocytosis (white blood cells $110 \times 10^9/L$, hemoglobin 73 g/L, platelets $636 \times 10^9/L$, basophils $4.8 \times 10^9/L$). Peripheral blood smears showed 80% mononuclear cells with abnormally clumped nuclear chromatin without prominent nucleoli, alongwith increased mature basophils. (Fig. 1a–d). Bone marrow smears revealed large amounts of mononuclear cells infiltration mimicking mature lymphocytes with abnormally clumped chromatin, basophilia and megakaryocyte dysplasia, which was characterized by the presence of micromegakaryocytes, megakaryocytes with small round nuclei and multiple round nuclei (Fig. 1e–h). Peripheral blood and bone marrow smears were re-stained to avoid the influence of improper dyeing and the result was the same as before. Flow cytometry using CD45 vs SSC gating strategy revealed an abnormal blast population and basophilia. The blast population was positive for

CD13, CD33, CD34, CD36, HLA-DR, CD117 and MPO. The basophils were positive for CD123 and CD11b, the blasts being negative for these markers. Besides, the basophils were positive for HLA-DR (Fig. 2). The patient had no prior history of chronic myeloid leukemia, and his BCR/ABL fusion gene was negative using RT-PCR method. Cytogenetic analysis of the BM cells indicated a 46,XY,t(4;12)(q12;p13)[20] karyotype. Due to the high ratio of blood and marrow blasts and dysplasia of myeloid and megakaryocyte, the patient was diagnosed with acute myeloid leukaemia with myelodysplasia related changes (AML-MRC) according to WHO classification [1–2]. The patient received treatment with DA (daunorubicin and cytarabine) protocol after the diagnosis was rendered, and achieved complete remission (CR) after 2 cycles of chemotherapy.

Basophilia in acute myeloid leukaemia may result in two potential differential diagnoses, namely, chronic myeloid leukemia- myeloid blast crisis (CML-MBC) and acute basophilic leukemia (ABL). A short duration of disease, absence of a prior history of chronic myeloid leukemia, no splenomegaly, and an absence of the Philadelphia chromosome/BCR-ABL fusion gene favored the diagnosis of a de novo AML-MRC over CML-MBC. The blasts with primary differentiation in ABL express CD9, CD13, CD33, CD22, CD36, CD123, CD34, HLA-DR and CD25 [3]. The current case showed a population of obvious mature basophils in morphology in bone marrow and peripheral blood smears, expressing CD11b, CD13 and CD123 along with myeloblasts, and indicated no expression of CD34, thus supporting a diagnosis of AML-MRC with basophilia over ABL. Besides, the basophils with aberrant HLA-DR expression, which may be related to part of the malignant clone. Therefore, whether this patient will develop into ABL remains to be seen.

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Fig. 1 Peripheral blood smears showed 80% mononuclear cells with abnormally clumped nuclear chromatin without prominent nucleoli, along with increased mature basophils. (a–d, Wright-Giemsa, $\times 1000$). Bone marrow smears revealed megakaryocyte dysplasia, which was characterized by the presence of micromegakaryocytes, megakaryocytes with small round nuclei and multiple round nuclei. (e–h, Wright-Giemsa, $\times 1000$)

Leslie Skeith et al. showed abnormal chromatin clumping in myeloblasts [4]. However, AML with basophilia at diagnosis, in which myeloblasts presented with abnormally clumped chromatin is very rare. The atypical morphology as a diagnostic pitfall led to initial diagnosis of

chronic lymphoproliferative disease (CLPD). Recognizing the atypical morphology is significant in differentiating it from CLPD, which is closely related to the treatment and prognosis of the patients. Flow cytometry plays an important role in establishing the immature nature and

Fig. 2 Flow cytometry using CD45 vs SSC gating strategy revealed an abnormal blast population and basophilia. The blast population was positive for CD13, CD33, CD34, CD36, HLA-DR, CD117 and

MPO. The basophils were positive for CD123 and CD11b, the blasts being negative for these markers. Besides, the basophils were positive for HLA-DR. (basophil: dark Green; blast: red) (color figure online)

myeloid lineage of the blasts in such cases with misleading morphology.

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