CORRESPONDENCE

Myeloid Sarcoma Presented as Generalized Lymphadenopathy: Mimicking Malignant Lymphoma

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Dear Editor

Myeloid sarcoma (MS) or granulocytic sarcoma is a tumor mass consisting of immature myeloid cells or blasts occurring at an anatomical site other than bone marrow [1]. It occurs in conjugation with previous or concurrent AML or in patients with other myeloid malignancies such as chronic myeloid leukemia (CML), other myeloproliferative disorder or myelodysplastic syndrome (MDS), especially in blastic phase of the disease and rarely; in an isolated de novo form without any other underlying malignancy. Common sites involved in myeloid sarcoma are lymph nodes, bone, skin, orbit and soft tissue [2]. Myeloid sarcoma manifesting as generalized lymphadenopathy is very rare [3–5] and pose diagnostic dilemma. Definite diagnosis of MS can be confirmed by histopathological examination with immunohistochemistry that allow the distinction of MS from lymphomas. Here we described a case of acute myeloid leukemia (AML) with concurrent MS, presented with generalized lymphadenopathy mimicking lymphoma.

A 22 year male presented with breathlessness, cough with minimal expectoration, loss of appetite and weight for 2 months. On examination he had mild pallor with multiple cervical and axillary lymphadenopathies. He has been started on anti-tubercular drugs for 2 months. Fine needle cytology done outside showed non-Hodgkin lymphoma. Computed Tomography of chest and abdomen revealed large lobulated soft tissue lesion in the antero-superior

mediastinum measuring about $8.2 \times 11.5 \times 10$ cm with enlarged discrete and conglomerated bilateral cervical, supraclavicular, axillary, anterior and posterior pericardial, right anterior peridiaphragmatic, mesenteric, periportal, peripancreatic, para-aortic, bilateral common and external iliac lymph nodes. There was hepatosplenomegaly with moderate right and minimal left pleural effusion; and mild pericardial effusion. Pleural fluid examination showed moderate cellularity, composed chiefly of lymphoid cells with scattered plasma cells, histiocytes and rare mesothelial cells, in a haemorrhagic background. Many of the lymphoid cells had irregular nuclei and open chromatin. The hemoglobin was 28 g/L, total leucocyte count was $18.46 \times 10^9/L$ and platelet count was $120 \times 10^9/L$. Peripheral blood smear showed leucoerythroblastic blood picture with 3% blasts and mild thrombocytopenia (Fig. 1a). Bone marrow smears were cellular with presence of 70% blasts and promonocytes (Fig. 1b). Bone marrow biopsy showed sheets of blasts which were positive for CD15 and CD68 (focal) (Fig. 1c) and negative for MPO and CD34. Flowcytometric immunophenotyping of bone marrow (Fig. 2) showed 56% blasts in blast region extending to myelo-monocytic region which were positive for CD45, cytoplasmic myeloperoxidase (MPO) (dim), CD13, CD33, CD64, CD14 (dim), CD11b, CD10, HLA-DR (heterogenous/dim), CD123 and CD16 (partial); and negative for cCD3, cCD79a, CD34, CD117, CD19, CD7, CD22, CD20, CD41a, CD4, CD5 and CD8. A final diagnosis of acute myeloid leukemia with monocytic differentiation was made. Core biopsy from left cervical lymph node (Fig. 3) sent for histopathological examination revealed complete effacement of the nodal architecture with infiltration of intermediate sized immature blastic cells with irregular and variable sized nuclei with coarse chromatin and one or two prominent nucleoli.

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Fig. 1 **a** Peripheral blood smear showing blasts (Leishman and Giemsa; 1000 $\times$). **b** Bone marrow aspiration smears are cellular showing presence of blasts and promonocytes (Leishman and Giemsa;

1000 $\times$). **c** Bone marrow biopsy showing sheets of blasts (H&E; 100 $\times$, (400 $\times$ inset) which were positive for CD15 and CD68 (focal)

Immunohistochemistry showed presence of tumor cells that were positive for leucocyte common antigen (LCA), CD99, CD43, CD15 (focal), CD68 (focal) and negative for MPO, CD34, CD3, CD5, CD117, CD 20 and terminal deoxynucleotidyl transferase (TdT), confirming the diagnosis of myelomonocytic sarcoma. Real time polymerase chain reaction for NPM, FLT3-ITD, INV 16 (p13q22)/t(16;16)(p13;q22), FLT3-TKD, BCR-ABL, AML-ETO, MLL and PML-RARA were negative. Conventional karyotyping showed normal 46XY. The patient was started on Started on conventional AML 7 + 3 induction (cytarabine 100 mg/m² for 7 days and daunorubicin 50 mg/m² for 3 days).

The incidence of MS in AML is about 3–5%. It may occur in any age group from infancy to nine decades of life with no sex predominance [6]. Myeloid sarcoma can involve any part of the body as skin, periosteum, intestine, lymph nodes, reproductive system, central nervous system, heart, lungs and oral cavity [6, 7]. Myeloid sarcoma is

composed of the same cell types as acute myeloid leukemia: granulocytic precursors, monocytic precursors, erythroid precursors, or even megakaryocytic precursors and named in accordance with the type of cell that composes the sarcoma (Granulocytic sarcoma (immature and differentiated), myelomonocytic sarcoma, monoblastic sarcoma, megakaryoblastic or erythroid sarcoma). Immature granulocytic sarcoma: CD34, CD43, CD117, lysozyme, MPO (<10%). Differentiated granulocytic sarcomas are positive for CD43, MPO, CD15, lysozyme, CD117 (variable), CD68 (<20%) and CD163 (<20%). Monoblastic sarcomas are positive for CD43, lysozyme, CD68, CD163, weakly for CD4, MPO (scattered) and negative for CD34. Monocytic sarcoma are positive for CD43, lysozyme, CD68, CD163, and MPO (variably). Myelomonocytic sarcomas are positive for both neutrophilic and monocytic markers [8]. Megakaryoblastic sarcomas are positive for CD43, CD34 (variable), CD117 (variable), CD41, CD42b, CD61, Factor VIII [9]. Erythroid sarcomas are positive for CD43,

Fig. 2 Flowcytometric immunophenotyping of bone marrow showing blasts in myelo-monocytic region which were positive for CD45, cytoplasmic MPO (dim), CD13, CD33, CD64, CD14 (dim), CD10,

HLA-DR (heterogenous/dim); and negative for cCD3, cCD79a, CD34, CD117, CD19, CD7, CD22, CD56

hemoglobin A, Glycophorin A, CD71, CD36 and CD117 (variable) [10]. FAB AML M4/M5 subtypes, CD56 positive blasts, cytogenetic abnormalities as t(8:21), *MLL* rearrangement, inversion 16 and infant leukemia are associated with the higher incidence of MS [5]. The most commonly expressed marker is CD68-KP1, followed by MPO, CD117, CD99, CD68/PG-M1, lysozyme, CD34, TdT, CD56, CD61/linker of activated T lymphocyte/factor VIII-related antigen, CD30, glycophorin A, and CD4 [11].

The major differential diagnoses are lymphoblastic lymphoma, Burkitt lymphoma, diffuse large Bcell lymphoma, small round cell tumor in children, and blastic plasmacytoid dendritic cell neoplasm [2]. MS poses a diagnostic dilemma in cases in which the peripheral blood smears do not show blasts or show leucoerythroblastic blood picture which is very common in lymphoma infiltration. Furthermore, there is also cytomorphic and histologic similarities of the blasts to large cell lymphoma. So the

Fig. 3 Core biopsy from left cervical lymph node showing complete effacement of the nodal architecture with infiltration by blastic cells (H&E; 100× and 400×) which were positive for LCA, CD43, CD99, CD15 (focal), CD68 (focal) and negative for CD34, CD117 and CD20

diagnosis is confirmed by immohistochemical and/or immunophenotypic analysis.

Compliance with Ethical Standards

Conflict of interest All the authors declared no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from the patient included in the manuscript.

References

- Pileri SA, Orayi A, Falini B (2008) Myeloid sarcoma. In: Swerdlow S, Campo E, Harris NL, Jaffe ES, Pileri SA, Stein H, Thiele J, Vardiman JW (eds) WHO classification of tumours of haematopoietic and lymphoid tissues. IARC, Lyon, pp 140–141
- Pileri SA, Ascani S, Cox MC et al (2007) Myeloid sarcoma: clinico-pathologic, phenotypic and cytogenetic analysis of 92 adult patients. *Leukemia* 21(2):340–350
- Hong S, Suh S, Seol HY, Cho J, Shin BK (2010) Myeloid sarcoma presenting as multiple lymphadenopathy: a case report. *J Korean Soc Radiol* 62:421–425
- Nandedkar S, Kawatra M, Malukani K (2013) Myeloid sarcoma de novo presenting as generalized lymphadenopathy. *Clin Cancer Investig J* 2(1):86–89
- Elyamany G, Khan M, El Hag I, El-Zimaity M, Albalawi M, Al Abdulaaly A (2013) Generalized lymphadenopathy as the first presentation of granulocytic sarcoma: a diagnostic challenge. *Case Rep Med* 2013:483291. doi:10.1155/2013/483291
- Paydas S, Zorludemir S, Ergin M (2006) Granulocytic sarcoma: 32 cases and review of the literature. *Leuk Lymphoma* 47(12):2527–2541
- Djurdjevic D, Jovanovic D, Antic D (2015) Isolated myeloid sarcoma of the neck and chest: differential diagnosis and therapeutic approach. *Open Med* 10:34–38

8. Alexiev BA, Wang W, Ning Y et al (2007) Myeloid sarcomas: a histologic, immunohistochemical, and cytogenetic study. *Diagn Pathol* 31(2):42
9. Novello M, Coli A, Della Pepa GM (2014) Myeloid sarcoma with megakaryoblastic differentiation mimicking a sellar tumor. *Neuropathology* 34(2):179–184
10. Wang HY, Huang LJ, Liu Z, Garcia R, Li S, Galliani CA (2011) Erythroblastic sarcoma presenting as bilateral ovarian masses in an infant with pure erythroid leukemia. *Hum Pathol* 42(5):749–758
11. Campidelli C, Agostinelli C, Stitson R, Pileri SA (2009) Myeloid sarcoma: extramedullary manifestation of myeloid disorders. *Am J Clin Pathol* 132(3):426–437