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LETTER TO THE EDITOR

Proerythroblasts as the Main Erythroid Dysplasia in Myelodysplastic Syndrome

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Here, we report a rare case of myelodysplastic syndrome (MDS) in which proerythroblasts appeared as the main component of erythroid dysplasia. A 74-year-old man visited our hospital with general weakness and dizziness for several months. Work up revealed pancytopenia (hemoglobin 5.3 g/dL, white blood cell count 2.4 x 10^3/μL with an absolute neutrophil count 1.6 x 10^3/μL, and platelet count 24 x 10^3/μL). A bone marrow examination revealed 60% cellularity with a myeloid: erythroid ratio of 1.4:1. The immature cells with fine chromatin and vacuolization were about 37% in all nucleated cells (ANC) (Figure 1A). The immunohistochemical stain revealed negative reactions to CD34, CD31, CD3, CD20, CD10, and CD117. They reveal positive reaction as a granular pattern to periodic acid-Schiff (PAS) stain and E-cadherin immunohistochemical stain (Figure 1B and C). E-cadherin is expressed on early erythroblasts and decreases gradually during cellular maturation. In the present case, the immature cells were identified as erythroid dysplasia, arrested in the proerythroblasts stage. In this case, the total erythroid precursors were about 42% of ANC and blasts were less than 1% of ANC. The typical erythroid dysplasia, such as multi-nuclearity and lobulated nuclei, were not found in this case, except nuclear chromatin clumping. By the diagnostic criteria, this case was diagnosed as MDS with multilineage dysplasia. Proerythroblasts are not

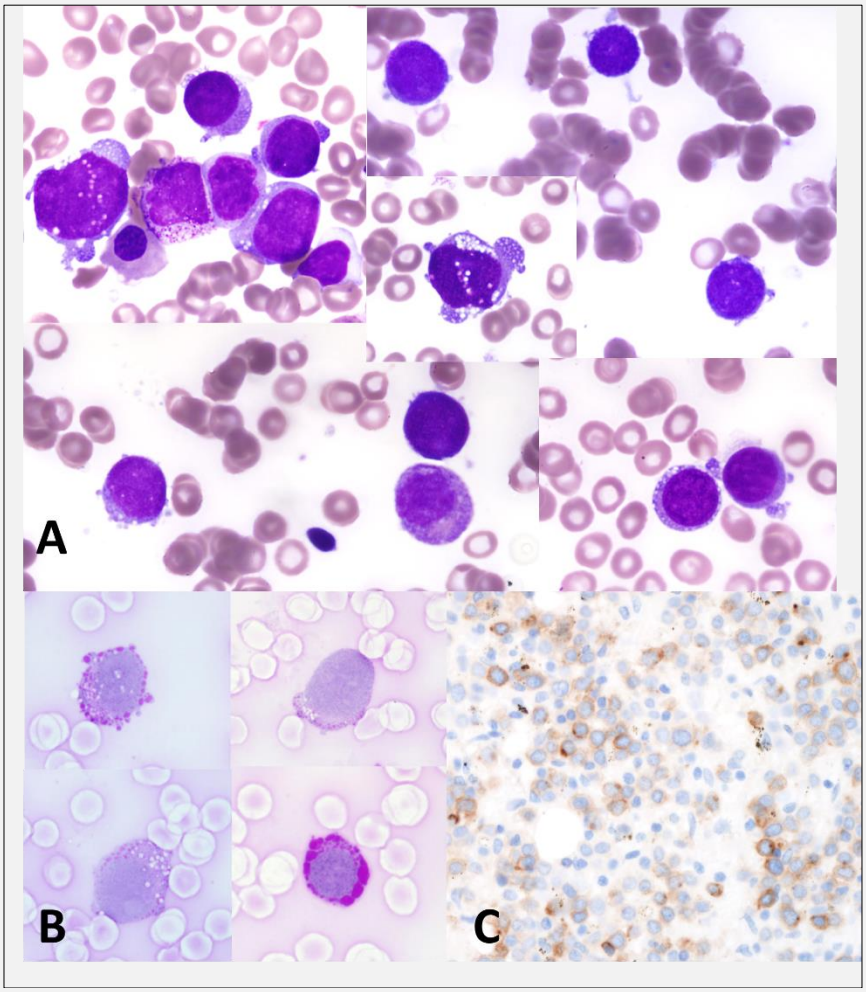

Figure 1. Morphologic findings from bone marrow aspirates (A - B) and clot section (C - G).

(A) H & E stain (x 1,000). Small-to-large immature erythroid precursors with fine chromatin and vacuoles. Some of them seemed like lymphoblasts with a scant amount of cytoplasm, and some of them had light-blue-grey cytoplasm and nucleoli. These cells reveal a fine or punctate granular pattern with periodic acid-Schiff (PAS) stain (B) (x 1,000) and positivity for E-cadherin.

usually described as a type of erythroid dysplasia in MDS [1,2]. In this case, the majority of erythroid precursors are immature proerythroblasts, suggesting the possibility of a preleukemic state of PEL. In previous reports, the clinical features of PEL and MDS with erythroid predominance were similar; however, LDH and blasts proportion were different between two diseases [3]. In this case, factors such as increased LDH (> 1,000 μ/L) and no increased myeloblasts (< 1%) were slightly more similar to PEL [3]. In cases where myeloid neoplasm with erythroid precursors are > 50% of ANC, there has been considerable interest and reports for the diagnosis [3,4]. In the present case, proerythroblasts (37% of ANC) appear as the main erythroid component (total erythroid precursors are about 42% of ANC). Before cells were identified through staining, the erythroid component could not be accurately calculated. This can be mistaken as lymphoid malignancy or other immature cells because there is no other typical erythroid dysplasia, and reports of MDS are very rare.

The cytogenetic analysis showed complex chromosomal abnormalities of 46~47,XY,del(5)(q13),+8,15,inv(17)(p13q11.2),der(19)hsr(19)(p13.3)add(19)(p13.3),-22,+1~2mar[cp8].

A cancer mutation panel by next-generation sequencing revealed *TP53* (p.Met426Val, missense) and *AXSL1* (p.Glu635fs, frameshift) mutations, known mutations in MDS. These mutations were also reported in PEL [5].

He experienced no adverse events related to decitabine therapy except myelosuppression, and he continued to receive chemotherapy.

Erythroid dysplasia with maturation arrest at the pro-erythroblastic stage without other typical dysplastic changes is rare in MDS. If typical dysplasia is absent, such cases can be confused with lymphoblasts or other immature cells. To address this, PAS or other immuno-histochemical stains are helpful for rapid differentiation. Clinical and molecular data should be collected to identify the characteristics of this phenotype.

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Declaration of Interest:
No potential conflict of interest relevant to this article was reported.

References:

1. Swerdlow SH, Harris NL, Jaffe E, et al. WHO classification of Tumours of Haematopoietic and Lymphoid Tissues. International Agency for Research on Cancer 2017:97-161 (ISBN 13: 978928 3244943). https://publications.iarc.fr/Book-And-Report-Series/Who-Classification-Of-Tumours/WHO-Classification-Of-Tumours-Of-Haematopoietic-And-Lymphoid-Tissues-2017

2. Mufti GJ, Bennett JM, Goasguen J, et al. Diagnosis and classification of myelodysplastic syndrome: International Working Group on Morphology of myelodysplastic syndrome (IWGM-MDS) consensus proposals for the definition and enumeration of myeloblasts and ring sideroblasts. Haematologica 2008;93:1712-7. (PMID: 18838480)

3. Ko PS, Liu YC, Yeh CM, et al. The uniqueness of morphological features of pure erythroid leukemia in myeloid neoplasm with erythroid predominance: A reassessment using criteria revised in the 2016 World Health Organization classification. PLoS One 2017;12:e0172029. (PMID: 28196090)

4. Srinivas U, Kumar R, Pati H, Saxena R, Tyagi S. Sub classification and clinico-hematological correlation of 40 cases of acute erythroleukemia - can proerythroblast/myeloblast and proerythroblast/total erythroid cell ratios help subclassify? Hematology 2007;12:381-5. (PMID: 17852448)

5. Wang W, Wang SA, Medeiros LJ, Khoury JD. Pure erythroid leukemia. Am J Hematol 2017;92:292-6. (PMID: 28006859)