LETTER TO THE EDITOR
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Rare Auer Rods Within Vacuole-like Inclusions of Acute Promyelocytic Leukemia

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Dear Editors,

A 46-year-old male presented to our hospital with fever, sore throat, gingival bleeding and skin ecchymosis for 4 days. His hemoglobin was 113 g/L, platelets was 44 $\times 10^9$/L, and white blood cell was 33.2$\times 10^9$/L with abnormal promyelocytes of 85% in the peripheral blood smear. Approximately 17% of abnormal promyelocytes exhibited pseudo Chediak-Higashi anomalies (PCH), including purplish-red granules, purplish-red inclusion bodies (**Fig**ure 1A), vacuole-like inclusions and Auer rods, some Auer rods within vacuoles of abnormal promyelocytes (Figure 1B). Bone marrow aspiration indicated about 93% abnormal promyelocytes, 20% of which with PCH anomalies. Purplish-red inclusions (Figure 1C-1E) of varying sizes and Auer rods within vacuoles (Figure 1F) could be found in the cytoplasm. The PCH anomalies were positive for the myeloperoxidase (MPO) stain (Figure 1G) and the periodic acid-Schiff (PAS) stain (Figure 1H).

The bone marrow biopsy reveals hypercellular marrow with increased immature cells. These cells exhibit large size, abundant cytoplasm, and round to irregular nuclei with fine chromatin. Flow cytometry analysis demonstrated that abnormal myeloid cells account for 94.5% of nuclear cells. Cytogenetic analysis of a bone marrow sample showed 46, XY, der(15), t(15;17)(q24.1;q21.2) [20]. The translocation of the *PML::RARA* fusion gene was confirmed by fluorescence in situ hybridization. Consequently, a diagnosis of acute promyelocytic leukemia (APL) with PCH anomaly was confirmed. After treated with all-trans retinoic acid (ATRA)-induced differentiation, and arsenic trioxide (ATO)-induced apoptosis, the patient achieved complete remission (CR).

PCH anomalies are giant cytoplasmic inclusions in myeloblasts or myeloid precursors [1], similar to those observed in the inherited Chediak-Higashi syndrome (CHS) [2]. They are often described in acute myeloid leukemia, but rarely observed in APL [3]. Electron microscopic studies have revealed that the origin of PCH anomalies is thought to be a result of fusion of azurophilic granules, which

contain numerous microcrystalline structures similar to Auer rods [4].
PCH anomalies in abnormal promyelocytes have been reported, including pink or salmon-pink round to oval granules [5,6,7], target-like giant granules surrounded by a clear halo and some indented cell nuclei [5], and pale inclusions [5]. The Auer rods within vacuole-like inclusions in acute promyelocytic leukemia have not been reported.

Keywords: pseudo Chediak-Higashi; acute promyelocytic leukemia

Abbreviations: pseudo Chediak-Higashi (PCH); myeloperoxidase (MPO); periodic acid-Schiff (PAS); acute promyelocytic leukemia (APL); all-trans-retinoic acid (ATRA); arsenic trioxide (ATO); Chediak-Higashi syndrome (CHS)

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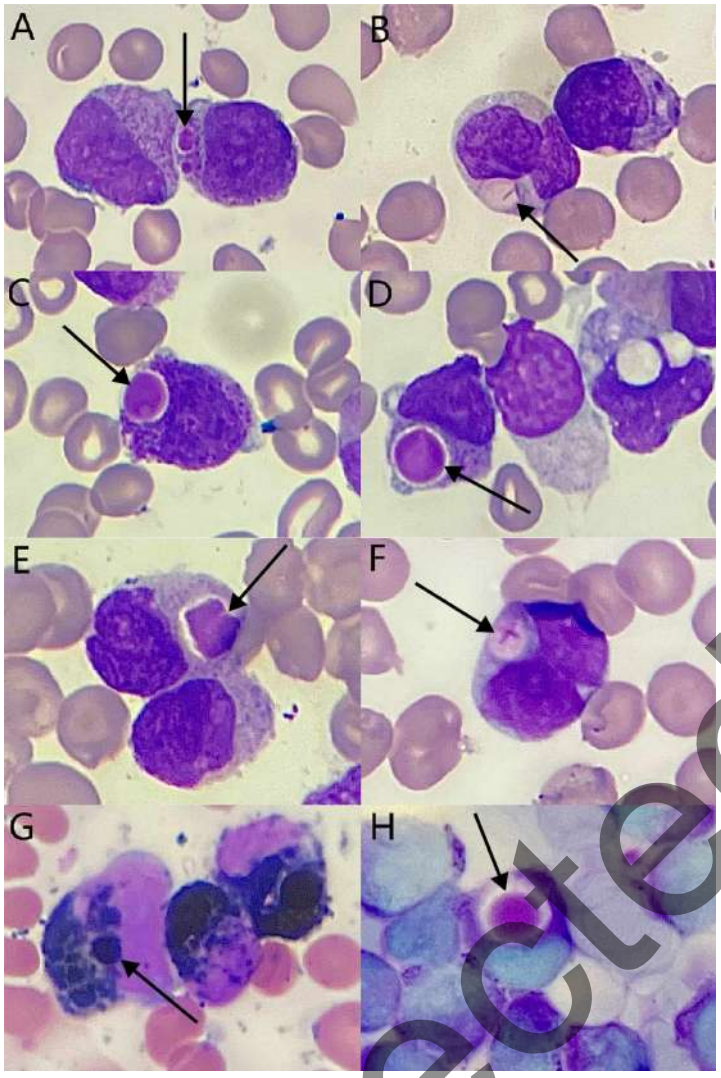

Figure 1. (A) Pseudo Chediak-Higashi anomalies on the peripheral smear; Wright-Giemsa, 1000 ×. (B) Needle-like structures within vacuole-like inclusions in abnormal promyelocytes; Wright-Giemsa, 1000 ×. (C-F) Pseudo Chediak-Higashi anomalies on the bone marrow smear; Wright-Giemsa, 1000 ×. (G) The PCH anomalies were positive for the MPO stain; 1000 ×. (H) The PCH anomalies were positive for PAS stain; 1000 ×.