CORRESPONDENCE

“Faggot Neutrophils!” in Non-acute Promyelocytic Leukemia: A Rare Occurrence

Anurag Gupta¹ · Krishna G. Reddy² · Manu Goyal¹

Received: 29 March 2018 / Accepted: 11 April 2018 / Published online: 16 April 2018
© Indian Society of Hematology and Blood Transfusion 2018

A 19 year old male presented with fever of 4 days duration without organomegaly or lymphadenopathy. Peripheral blood evaluation revealed anemia, thrombocytopenia and leucocytosis. Peripheral smear and bone-marrow aspirate showed > 20% blasts, many containing single Auer rod. Maturing myeloid, few neutrophils including few dysmorphic forms also showed single Auer rod. “Faggot” like multiple Auer rod collections were noted in the neutrophils (Fig. 1a, b). A diagnosis of acute myeloid leukemia (AML) with aberrant expression of CD19 and CD56 was rendered by flowcytometry. Cytogenetic studies showed the presence of t(8;21) and the karyotype was reported as 45,X,-Y,t(8;21)(q22;q22)[13]/46,idem,+8[07] as per the ISCN 2013 (Fig. 1C). Fluorescence in situ hybridization for PML-RAR α was negative (Fig. 1D). The patient was started on cytarabine–daunorubicin based chemotherapy and is under follow up.

Auer rods, first reported by John Auer in 1906 and first recognised by Thomas McCrae, are considered pathognomonic of myeloid differentiation. They are described as intracytoplasmic rod shaped peroxidase-positive structures formed by aggregation, and concentration of the peroxidase granules in the leukemic blasts [1, 2]. They are also called as McCrae rods. Auer rods can be seen in M1 to M6 French–American–British classification of acute myeloid leukemia (AML), however they are most commonly seen

in acute promyelocytic leukemia, AML M3, where they are arranged in fascicles or bundles in cells named as “faggot cells”.

Faggot cells, which morphologically is considered diagnostic of acute promyelocytic leukemia (APL), are abnormal promyelocytes containing 3 or more Auer rods. Occurrence of more than two Auer rods in blasts is unusual in a non-APL cases [3].

Auer rods in neutrophils and maturing myeloids is a rare morphological finding. Presence of Auer rods in neutrophils is indicative of nucleocytoplasmic asynchrony [4]. A literature review published by Singh et al. in 2015 showed 12 case reports where presence of Auer rods was documented in neutrophils, myelocytes, and rarely in monocytes in cases belonging to the FAB AML-M2, M3 category and mixed lineage leukemia [5, 6]. Cases of Auer rods in mature neutrophils described in acute promyelocytic leukemia on treatment indicates these abnormal neutrophils to be derived from leukemic promyelocytes. It has been postulated that though ATRA is capable of inducing differentiation of leukemic promyelocytes, it is incapable of inducing morphological maturation of neutrophils [7].

In the present case, multiple Auer rods were seen in mature neutrophils, prompting us to coin the term “faggot neutrophils”. The possibility of acute promyelocytic leukemia was excluded as the FISH for PML RAR α was negative. Cytogenetic studies showed the presence of t(8;21). In non-acute promyelocytic leukemia cases, occurrence of “faggot cells” is rare, whereas occurrence of “faggot neutrophils” is rarer! [8–10].

Presence of “faggot neutrophils” in a case should alert one not only to evaluate for acute promyelocytic leukemia, but also for t(8;21) and cytogenetic studies play a crucial role.

✉ Anurag Gupta
dranuraggupta30@gmail.com

¹ Department of Hematopathology and Molecular Genetics, AMPATH, Nallagandla, Serilingampally, Hyderabad 500019, India

² Manipal Super Specialty Hospital, Vijayawada, Andhra Pradesh 521001, India

Fig. 1 **a, b** Dyspoietic neutrophils with multiple Auer rods (arrow mark) in a background with blasts containing single Auer rods (Geimsa stain, original magnification $\times 100$ oil immersion). **c** Karyogram showing t(8;21) (GTG banding, 100 $\times$ oil immersion). **d** FISH

for PML RAR α showing absence of any fusion signals (PML/RARA Dual Color, Dual Fusion Translocation Probe from Vysis, Abbott molecular, Des Plaines, IL)

Compliance with Ethical Standards

Conflict of interest Authors declare that there are no conflicts of interest nor any financial support for this work.

References

- Bain BJ (2011) Auer rods or McCrae rods? *Am. J Hematol* 86(8):689
- Freeman JA (1966) Origin of Auer bodies. *Blood* 27(4):499–510
- Arber DA, Brunning RD, Le Beau MM, Falini B (2008) Acute myeloid leukemia with recurrent cytogenetic abnormalities. In: Swerdlow SH, Campo E, Harris NL, Jaffe ES, Pileri SA, Stein H, Thiele J, Vardiman JW (eds) *WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues*. International Agency for Research on Cancer, Lyon, pp 110–123
- Bainton DF, Friedlander LM, Shohet SB (1977) Abnormalities in granule formation in acute myelogenous leukemia. *Blood* 49(5):693–704
- Singh MK, Gupta R, Surabhi K, Rahman K (2015) Auer rods in polymorphs in a case of acute myeloid leukemia. *Clin Cancer Investig J* 4:476–478
- Dmitrienko S, Vercauteren S (2012) Auer rods in mature granulocytes of a patient with mixed lineage leukemia. *Blood* 119(19):4348
- Luu HS, Rahaman PA (2015) Mature neutrophils with Auer rods following treatment with all-trans retinoic acid for acute promyelocytic leukemia. *Blood* 126(1):121
- Sehgal T, Sharma P, Varma N (2014) Faggot cells in a non-promyelocytic acute myeloid leukemia. *Hematol Oncol Stem Cell Ther* 7(3):120–122

9. Guérin E, Mahon F-X, Lippert E (2008) Bundles of Auer rods in blast cells and mature neutrophils in a non-promyelocytic acute myeloblastic leukaemia. *Br J Haematol* 141(6):749
10. Sehgal T, Singh P, Kaul E (2018) Stodtmeister cells (polymorphs with Pelger-Huët anomaly) showing “faggots” in mixed phenotypic acute leukemia (T/Myeloid). *Indian J Hematol Blood Transfus Off J Indian Soc Hematol Blood Transfus* 34(1):148–150