AUER RODS IN MATURE NEUTROPHILS IN A CASE OF ACUTE PROMYELOCYTIC LEUKEMIA

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ABSTRACT Acute promyelocytic leukemia is characterized by the presence of atypical promyelocytes in bone marrow and peripheral blood. Neoplastic promyelocytes, which often have Auer rods, are most commonly seen in early myeloid precursors in certain subtypes of myeloid leukemia. A 63-year-old male patient was admitted to our clinic with the complaints of malaise and weight loss for several months, presented with leucopenia and mild anaemia. There were no findings of organomegaly, lymphadenopathy and bleeding diathesis and no evidence of infection. Bone marrow aspiration and biopsy which was performed with the preliminary diagnosis of myelodysplastic syndrome revealed a slightly increased Myeloid/Erythroid ratio, distinct maturation arrest in the cells of myeloid lineage 15-20% of which have nucleocyttoplasmic asynchrony, course cytoplasmic granules and Auer rods. Auer rods were also present in the cytoplasm of mature neutrophils. Additionally, megakaryocytes were also dysplastic. The immunohistochemical staining was positive for CD117 in 10% of the cells, and there was no staining for CD34. The diagnosis was obscure until the fluorescein in situ hybridization results which was positive for PML-RARa fusion t(15;17) (q24.1;q21.2) was received. The patient was eventually diagnosed with acute promyelocytic leukemia. This unusual case of APL was characterized with the rarity of atypical promyelocytes in the bone marrow, distinct dysplasia in the myeloid and megakaryocytic lineages and silent clinical course without coagulopathy which caused a delay in diagnosis, and well response to treatment.

KEYWORDS acute promyelocytic leukemia, Auer rods, mature neutrophils

Introduction

Acute promyelocytic leukemia (APL) is characterized by the presence of atypical promyelocytes in bone marrow and peripheral blood. The key feature of the promyelocyte is the presence of many violet granules in the cytoplasm which often have dense or coarse patterns, mostly obscuring the nucleus. Neoplastic promyelocytes often have Auer rods or sometimes Auer rod bundles. Auer rods, which are pathognomonic of acute myeloid leukemia (AML), result from crystallization of myeloperoxidase granules. They are most commonly seen in early myeloid precursors in certain subtypes of myeloid leukemia. Presence of Auer rods in mature neutrophils is sporadic [1,2].

Case Report

A 63-year-old male patient was admitted to the outpatient clinics with the complaints of malaise and weight loss for several months. Complete blood count was by Hb 123 g/L, MCV 91.9 fL, leukocytes 1850/µL, absolute neutrophil count 260/µL, platelets 99 x103/µL. The biochemical parameters including kidney and liver function tests and lactate dehydrogenase levels were normal. In the peripheral blood smear, there wasn’t any considerable finding other than leucopenia, and the platelet count was more than 150 x103/µL. No nutritional deficiency was found
Table 1  Adult patients presenting with Auer Rods in mature granulocytes.

<table>
<thead>
<tr>
<th>Author</th>
<th>Age, sex</th>
<th>Presenting WBC count/µL</th>
<th>Morphological features</th>
<th>Cytogenetics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davies [4]</td>
<td>41, M</td>
<td>19,200</td>
<td>AML</td>
<td>Not done</td>
</tr>
<tr>
<td>Kanoh [5]</td>
<td>73, M</td>
<td>15,500</td>
<td>AML-M4</td>
<td>Not done</td>
</tr>
<tr>
<td>Ashihara [6]</td>
<td>50, M</td>
<td>13,300</td>
<td>AML-M3 (APL)</td>
<td>t (15;17)</td>
</tr>
<tr>
<td>Guerin [8]</td>
<td>67, M</td>
<td>24,100</td>
<td>Dysplasia</td>
<td>Complex karyotype</td>
</tr>
<tr>
<td>Rashid [9]</td>
<td>30, M</td>
<td>13,000</td>
<td>Granulocytic dysplasia, Pseudo Pelger Huet abnormity</td>
<td>del Y</td>
</tr>
<tr>
<td>Luu [10]</td>
<td>37, F</td>
<td>2,100</td>
<td>Auer rods observed on day 16 of ATRA treatment in mature neutrophils</td>
<td>t (15;17)</td>
</tr>
</tbody>
</table>

Figure 1: Auer rods were demonstrated in the cytoplasm of mature neutrophils.

in the sentinel tests for anaemia aetiology and the rheumatological tests were in normal range. There were no findings of organomegaly, lymphadenopathy and bleeding diathesis and no evidence of infection. Bone marrow aspiration and biopsy which was performed with the preliminary diagnosis of myelodysplastic syndrome revealed a slightly increased Myeloid/Erythroid ratio, distinct maturation arrest in the cells of myeloid lineage 15-20% of which have nucleocytoplasmic asynchrony, course cytoplasmic granules and Auer rods. Auer rods were also present in the cytoplasm of mature neutrophils [Figure 1]. Additionally, megakaryocytes were also dysplastic. The immunohistochemical staining was positive for CD117 in 10% of the cells, and there was no staining for CD34. The diagnosis was obscure until the fluorescence in situ hybridization results which was positive for PML-RARA fusion t(15;17) (q24.1;q21.2) was received. Bone marrow cytogenetics also confirmed the presence of a reciprocal translocation between the chromosomes 15 and 17 in 13 metaphase plates. The patient was eventually diagnosed with APL and received all-trans retinoic acid (ATRA) and idarubicin induction.

Discussion

Presence of Auer rods in mature neutrophils is extremely rare but described in both adult and pediatric patients with various APL, AML with t(8;21) and AML with maturation [3-10]. Adult patients presenting with Auer Rods are summarized in the table I. Generally, patients presented with mild leukocytosis or leukopenia, and dysplasia in the myeloid lineage seems to be the common characteristic. Auer rods in the mature neutrophils in AML is evidence of cytoplasmic immaturity representing the presence of nucleocytoplasmic asynchrony. They are known to confer a favourable prognosis that is independent of cytogenetics. This unusual case of APL was characterized with the rarity of atypical promyelocytes in the bone marrow, distinct dysplasia in the myeloid and megakaryocytic lineages and silent clinical course without coagulopathy which caused a delay in diagnosis, and well response to treatment.

Conclusion

We have shown that Auer rods in mature neutrophils are associated with APL. Their presence in mature neutrophils point that these cells are part of a malign clone; but, their role is still unclear. A diagnosis of APL should be kept in mind in adult patients with cytopenia in blood count and silent clinical course.

Competing Interests

None

Funding

None

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distinguishes cases with underlying PLZF/RARA gene re-

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