Pleural Effusion as an Unusual Initial Presentation of Acute Myeloid Leukemia

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Abstract Pleural effusions in acute myeloid leukemia (AML) can have wide differential diagnosis, however AML presenting as pleural effusion with leukemic infiltration is rarely documented. A 22 year old male presented with pleural effusion for 3 months and subsequently diagnosed as AML M2, which prompted us for this communication.

Keywords Malignant pleural effusion · Acute myeloid leukemia · Hematologic malignancy

Dear Editor,

Pleural effusions in acute myeloid leukemia (AML) can have wide differential diagnosis, however AML presenting as pleural effusion with leukemic infiltration is rarely documented. A 22 year old male presented with pleural effusion for 3 months and subsequently diagnosed as AML

M2, which prompted us for this communication. The patient presented with three month history of low grade fever, productive cough and dyspnoea on exertion. There was no history of night sweats, lymphadenopathy, bony pains or bleeding. He had normal hemogram, without any blasts on peripheral smear and pleural effusion with lymphocytic pleocytosis and no hepatosplenomegaly. He received anti-tubercular therapy for 3 months. In view of no improvement, he was referred to our centre. On examination, patient had no pallor, icterus or lymphadenopathy. He had left sided pleural effusion. His liver and spleen were palpable 4 and 3 cm below costal margin respectively. Rest of systemic examination was normal.

Laboratory investigations at presentation revealed hemoglobin, total leucocyte count and platelets were 11.7 gm%, $5.2 \times 10^3/\text{cumm}$ and $97 \times 10^3/\text{cumm}$ respectively. Peripheral blood smear revealed 52 % blasts. Pleural fluid protein was 5.2 g/dL, sugar was 34 mg/dl and the ratio of total pleural protein to serum total protein >0.5 . Pleural fluid culture was sterile and adenosine deaminase was 20 U/L. Pleural fluid cytologic examination revealed a non hemorrhagic tap with many abnormal large cells which were morphologically identical to blasts in his peripheral blood on Giemsa stain. These blasts also showed Auer rods (Fig. 1). Bone marrow aspirate and biopsy examination revealed diffuse replacement by blasts with maturation with Auer rods. On immunophenotyping, blasts were positive for CD 13, CD 33, CD34, HLA-DR, MPO and negative for CD10, CD 19, CD 117, CD7, Tdt, CD79a, CD11c, CD64, cytoplasmic CD3. Bone marrow cytogenetic study was normal. Pleural fluid cytochemistry and immunophenotyping was not done as the blasts showed Auer rods, implying that these were also myeloblasts. Hence the diagnosis of AML-M2 with malignant pleural effusion was made.

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Fig. 1 Pleural fluid aspirate showing large atypical cells with Auer rods (Giemsa stain, 40×)

He was started on conventional 3 + 7 induction regimen with daunorubicin and cytarabine for AML. Bone marrow aspirate on day 14 of induction revealed eighty percent blasts, so second induction with HAM was given following which pleural effusion disappeared however he had delayed recovery of peripheral blood counts. Bone marrow done on day 47 of HAM was in remission. He was started on consolidation therapy with HiDAC but expired during the neutropenic phase.

Malignant pleural effusions are relatively uncommon in cytopathology. A study from Duke University looking on 5,888 pleural effusions found 9.9 % to be malignant. Of the malignant effusions 75.7 % were carcinomatous, 14.3 % were large cell undifferentiated carcinoma, and 15.0 % were lymphoma/leukemia [1]. Non-Hodgkin lymphomas were most common cause amongst hematological malignancies [1–3].

Acute leukemia is very rarely diagnosed in a pleural effusion. Common causes of effusions in patients with leukemia include infection, drug toxicity, complications of therapy etc. Leukemic pleural effusions are more common in patients with acute lymphoblastic leukemia rather than AML; most commonly with megakaryocytic or monocytic differentiation [4, 5].

Cakir et al. [6] found 364 out of 4,684 pleural effusions (7.8 %) positive for cancer cells. Only one case of chronic myeloid leukemia and one of AML were found. Awasthi et al. [3] reviewed 898 samples and found 164 samples

positive for malignancy of which 29 had various hematologic malignancies, including one with acute lymphoblastic leukemia but not AML.

The true incidence of leukemic effusion is not known. It can occur at presentation, during advanced, refractory disease or upon relapse [7–9]. Prognosis is variable, with most cases reporting poor prognosis. Treatment success has been reported either with induction chemotherapy or stem cell transplantation [10]. The present case presented with pleural effusion for 3 months duration with normal hematological parameters, which subsequently progressed to bone marrow involvement.

To conclude, AML presenting as pleural effusion is very rare, especially in AML M 2 subtype. Treatment remains same with induction therapy followed by consolidation or bone marrow transplant.

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