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Case Report

HEMATOCYTOLOGICAL EVALUATION OF ACUTE MYELOID LEUKEMIA MANIFESTING AS PLEURAL EFFUSION

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A B S T R A C T

Malignant pleural effusions can occur in the setting of both solid and haematological malignancies with carcinomas representing more than three-quarter of the cases. Haematological malignancies can occasionally present with or develop pleural effusions during the clinical course of the disease and treatment. Among the most common disorders are Hodgkin's and Non – Hodgkin's lymphomas with a frequency of 20-30%, especially if the mediastinal involvement is present. Acute and chronic leukaemias rarely cause pleural effusion [1]. Acute myeloid leukaemias (AML) are defined as clonal expansions caused by acquired oncogenic mutations that impede differentiation, leading to accumulation of myeloid blasts in the marrow. Extramedullary disease and cutaneous manifestations are rare presenting features of this disease [2]. Pleural effusion caused by leukemic infiltration is an unusual extramedullary manifestation of the disease. We reported a case of a 54 years old female with AML with monocytic differentiation on chemotherapy who was admitted to the hospital with the complaints of shortness of breath and orthopnoea.

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INTRODUCTION

A 54 years old female diagnosed as acute myeloid leukaemia with monocytic differentiation on chemotherapy presented with the complaint of shortness of breath and orthopnoea. There was no complaint of fever, pain in abdomen, bleeding from any site or melaena. Patient was a known case of dilated cardiomyopathy with severe left ventricular dysfunction. On examination, the patient was conscious and oriented. Bilateral air entry was reduced (right lung> left lung). Hepatomegaly was present, 4-5 cm below the right coastal margin. Chest radiograph revealed right sided hydropneumothorax for which ICD insertion was done. CECT abdomen imaging revealed nodular heterogenous enhancement of the liver parenchyma with mild hypertrophy of the caudate lobe -likely liver parenchymal changes, mild hepatomegaly, minimal ascites and subcentimetric to centimetric sized lymph nodes in the peripancreatic, periportal, gastrohepatic ligament region and in the mesentry. Peripheral blood smear examination at presentation showed a dimorphic predominantly macrocytic picture and values as: Hb: 9.2g%; TLC: 9900; DLC: Atypical cells: 58% Polymorphs: 22 % Lymphocytes: 16% Monocytes: 04%. Absolute platelet count: 80,000/µl. Bone marrow aspirate comprised of myeloid cells with paucity of mature forms and blasts/ atypical cells constituting more than 30% of all the nucleated cells. The cells had high N:C ratio, fine chromatin with nuclear indentation (? Monocytic) in some and scanty to moderate amount of cytoplasm. Few normal myeloid precursors including eosinophilic precursors, normoblastic erythroid precursors, megakaryocytes and plasma cells were also seen. Sudan and MPO stain were positive in some of the atypical cells.

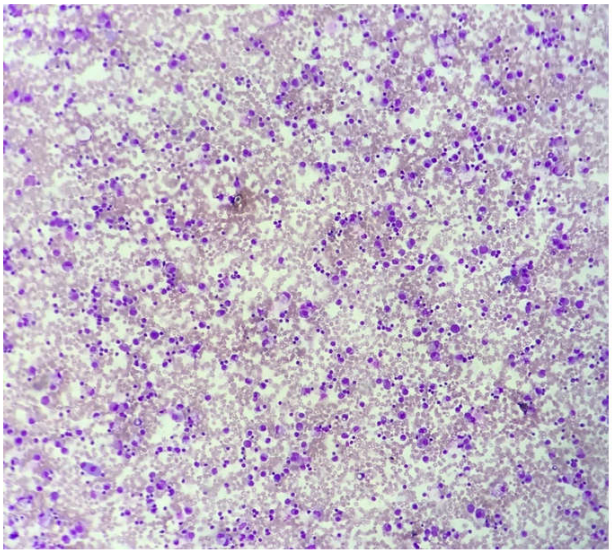

Figure 1 Leishman stained smear (10X) from pleural fluid revealing myeloid cell population

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These features favoured the diagnosis of acute myeloid leukaemia with monocytic differentiation. On immunopheno typing, side scatter vs CD45 population (68%) was positive for CD45, CD64, CD4, CD13, CD33, MPO, HLA-DR.

We received 30ml of pleural fluid. Smears prepared and examined had blasts admixed with lymphocytes, reactive mesothelial cells and macrophages in a haemorrhagic background. Staining for myeloid precursors using myeloperoxidase was positive. Cytological findings were positive for malignancy (AML).

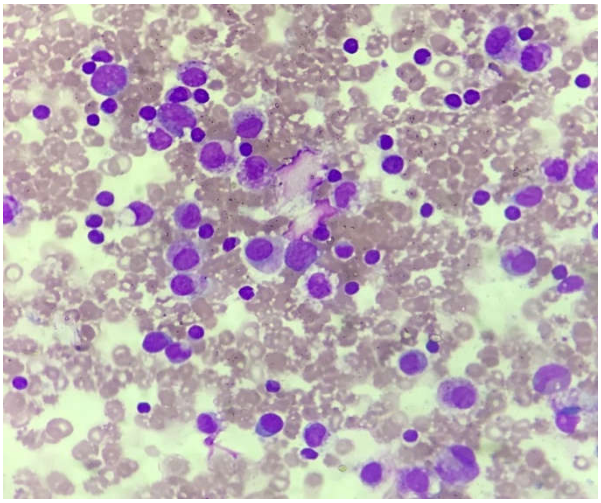

Figure 2 Leishman stained smear (40X) from pleural fluid revealing myeloid precursors including myeloblast and metamyelocyte

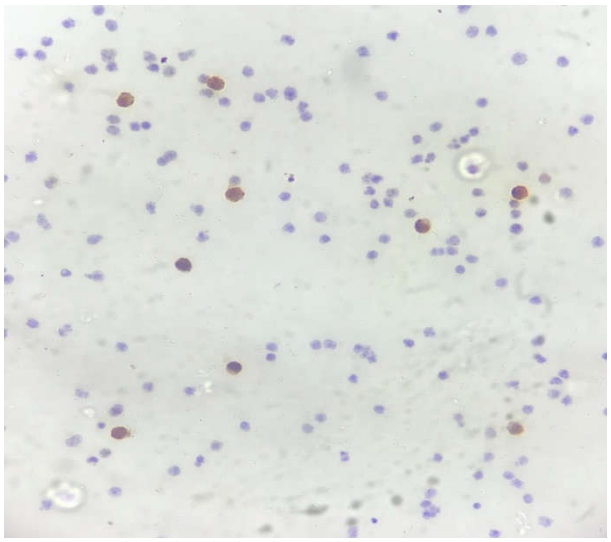

Figure 3 Immunohistochemical staining with MPO. Myeloid precursors show immunoreactivity with myeloperoxidase

DISCUSSION

The myeloid leukemias are a heterogenous group of diseases characterised by infiltration of blood, bone marrow and other tissues by neoplastic cells of haematopoietic system. Acute myeloid leukemia is a neoplastic process with blasts more than 20% in peripheral blood or bone marrow (according to WHO classification of haematological malignancies 2017). The incidence of AML increases with age and is higher in males than females. Patients with AML most often present with non-specific symptoms either gradually or abruptly including features of anaemia, infections, bleeding or easy bruising, anorexia and weight loss. Occasionally, the presenting symptoms can be bone pain, lymphadenopathy, cough, headache or diaphoresis. Rarely, the patients may present with symptoms from a myeloid sarcoma with more commonly involved sites being skin, lymph node, gastrointestinal tract soft tissues and testis[3].

Clinically significant pleural effusionsare rarely encountered in patients with AML. If present, the common causes include viral or bacterial infections, other disseminated solid tumours or as a complication of chemotherapy.

Malignant pleural effusions are uncommon in cytopathology. A study from Duke University found only 9.9% to be malignant of 5,888 pleural effusions examined out of which 75.7% were carcinomatous, 14.3% were large cell undifferentiated carcinoma and 15.0% were lymphoma/ leukaemia [4]. Leukemic pleural effusions are more common in patients with acute lymphoblastic leukaemia than acute myeloid leukaemia, most commonly with megakaryocytic or monocytic differentiation [5,6]. Cakir *et al* found 364 of 4684 pleural effusions to be positive for malignancy of which only one case was of acute myeloid leukaemia [7]. Awasthi *et al* examined 898 pleural effusion samples of which 164 were found to be positive for malignancy; 29 of these had various haematological malignancies, including one with acute lymphoblastic leukaemia and none of acute myeloid leukaemia [8].

Likewise, our case with AML with monocytic differentiation presented with pulmonary involvement having signs and symptoms secondary to pleural effusion rather than the classical presentation of acute myeloid leukaemia. So, this was an unusual case where there were no complications of the hematologic dyscrasia such as bleeding and recurrent infections but with varied physical findings of organomegaly and pleural effusion. This demonstrates the importance of biochemical analysis and cytopathology specimens obtained as pleural fluid since an early detection of any determined disease could guide effective therapy. AML in this particular case and prompt treatment could undoubtedly contribute in avoiding complications associated with the condition; an essential factor for improving quality of life.

CONCLUSION

Leukemic pleural effusions are an uncommon clinical presentation. However, the incidencemay be increasing as a result of longer survival with improved chemotherapies. Cytogenetic studies must, therefore be done as a routine part of pleural fluid analysis in cases of AML.

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