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Introduction :

Pleural effusions are uncommon complications of hematological malignancies and are very rarely the presenting sign of undiagnosed leukemia. When effusions do occur in the setting of malignancy, they commonly have an infectious etiology [1]. Malignant pleural effusion (MPE) may be underdiagnosed because of low diagnostic yield from cytopathological analysis. Since MPE may be an indicator of poor prognosis [1], a valid and timely diagnosis is of utmost importance.

We present a middle-aged, previously healthy male who developed pleural leukemic infiltration as the acute presentation of malignancy. We posit that MPE should be considered a differential in patients with seemingly spontaneous pleural effusions.

Case Description:

A 45-year-old male with no significant medical history presented with one month of exertional dyspnea. He was a never-smoker. Examination was significant for axillary lymphadenopathy and hepatosplenomegaly. There were bilateral decreases in breath sounds, suspicious for pleural effusions, which were confirmed by CTPA. His labs revealed neutrophilic leukocytosis (neutrophils manual 9 [44 - 80 %], WBC 79.8 [4.8 - 10.8 K/uL]), atypical lymphocytosis (atypical lymphocytes manual 50%), normocytic anemia and thrombocytopenia (platelets 9 K/uL [130 - 400 K/uL]). Thoracocentesis revealed exudative lymphocytic predominance with adenosine deaminase of 28.4 IU/L. The cytology was positive. Peripheral blood smear (**Figure 1**) showed marked lymphocytosis with premature cells. Lymph nodes and bone marrow biopsy (**Figure 2**) showed 81% blast cells positive for CD3, CD2, CD5, CD7, and negative for myeloperoxidase. Flow cytometry showed T-cell acute lymphoblastic leukemia. He was referred for induction chemotherapy.

Figures:

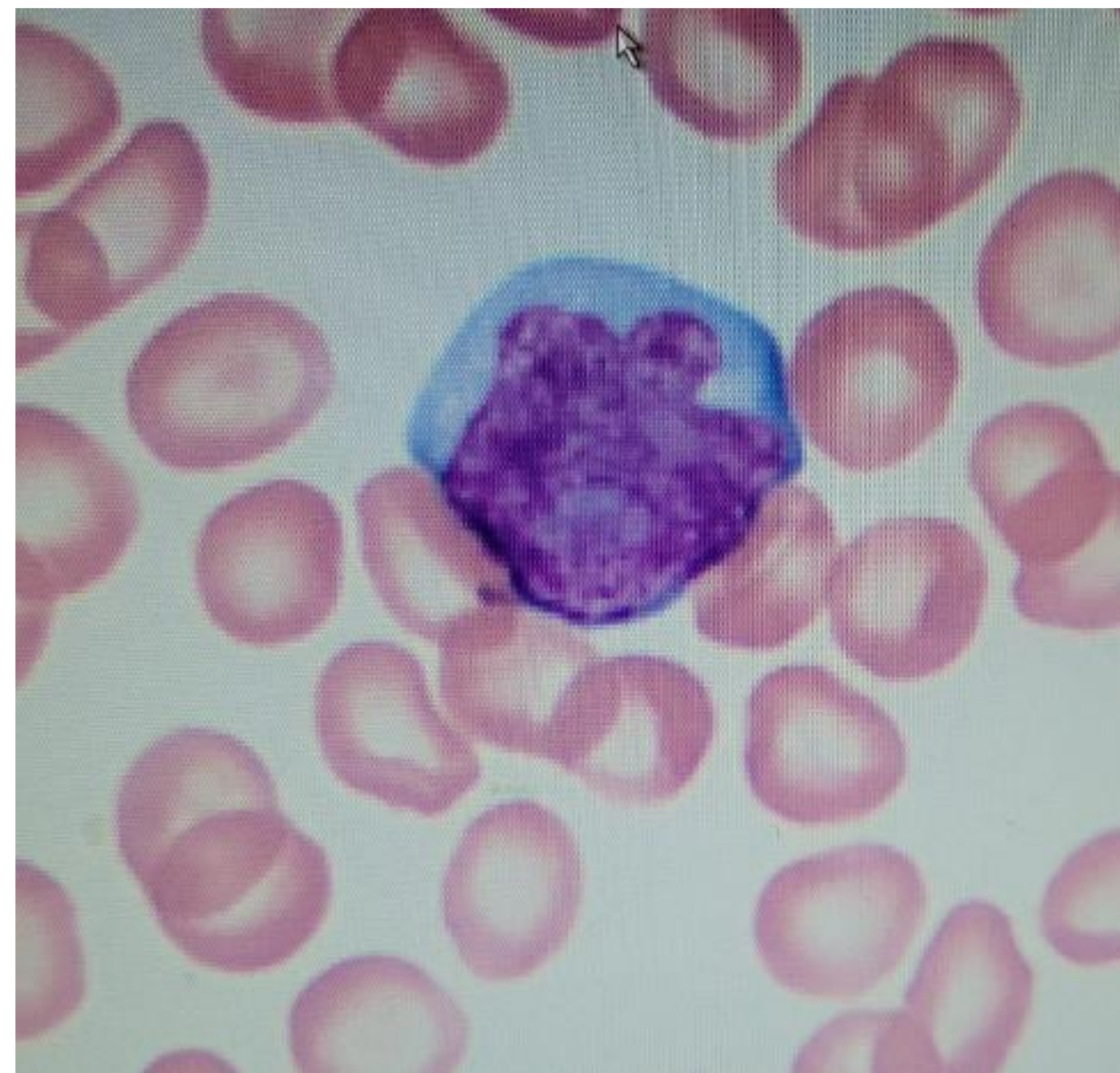


Figure 1: Peripheral blood smear showing blast element with immature chromatin and prominent nucleoli and irregular nuclear membrane.

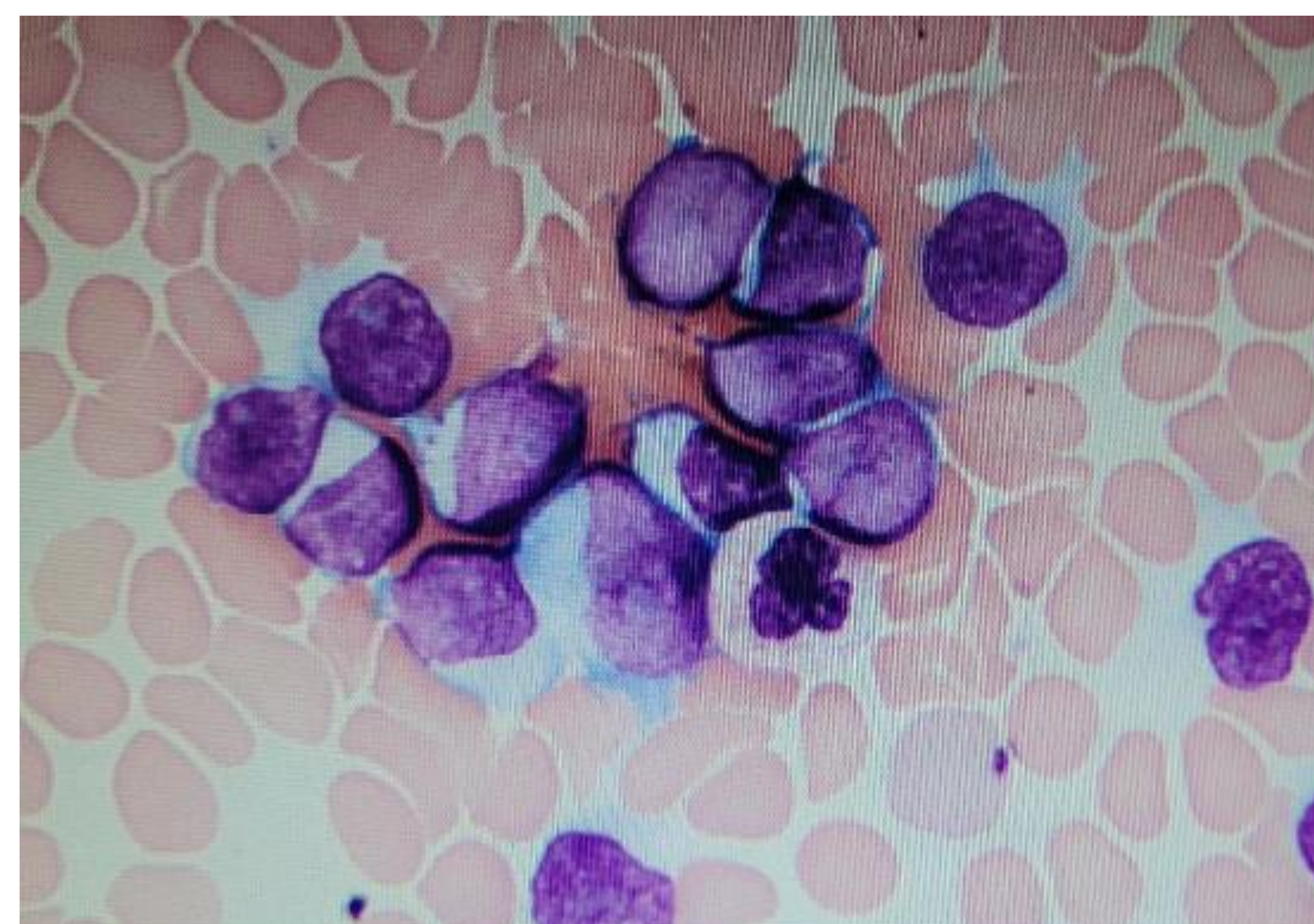


Figure 2: Bone marrow aspiration smear showing a cluster of blast cells with prominent nucleoli with a high N:C ratio.

Discussion:

Leukemias rarely present with pleural effusion, especially as the first manifestation. This complication is more common in solid tumors, lymphomas, and carcinomas. Presence of MPE may serve as an indicator of the development of AML in patients with MDS [2,3]. 10%-30% of patients who receive bone marrow transplant develop pleural effusion, although this could be of any cause and not necessarily due to MPE. The prognostic implications of MPE are unclear, but evidence suggests that survival depends on the underlying malignancy and its response to treatment. In most cases, the pleural fluid responds to treatment of the primary disease, whereas resistant or relapsing cases may require pleurodesis.

Cytopathology has a limited role in hematologic malignancy due to its low diagnostic potential. To improve the yield, cytogenetic studies may be considered a routine component of pleural fluid analysis in a subset of patients without identifiable risk factors.

Conclusion:

This case emphasizes the need to be vigilant in determining the causes of pleural effusions in patients whose other causes have been ruled out.

References:

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- [2] Duhan A, Kalra R, Kamra HT, et al. Leukaemic pleural effusion as a manifestation of acute myeloid leukaemia: a case report and review of literature. *Ecancermedicalscience.* 2014;8:397. Published 2014 Feb 5. doi:10.3332/ecancer.2014.397. PMID: 24567754 .
- [3] Wang ST, Chen CL, Liang SH, Yeh SP, Cheng WC. Acute myeloid leukemia with leukemic pleural effusion and high levels of pleural adenosine deaminase: A case report and review of literature. *Open Med (Wars).* 2021;16(1):387-396. Published 2021 Mar 12. doi:10.1515/med-2021-0243. PMID: 33748423