A Diagnosis in the Pleural Space – A Rare Extramedullary Involvement of Acute Myeloid Leukemia

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BACKGROUND

Extramedullary Acute Myeloid Leukemia (AML) arises from a site outside of the bone marrow. While it is a known manifestation of AML the overall incidence has not been established in literature with a range from 2.5%-30% [1].

Patients with monocytic AML tend to have higher incidences [1]. Extramedullary disease is not an independent prognostic factor. Outcomes in extramedullary disease are linked to underlying cytogenetic and molecular characteristics [2].

While other studies find that patients with extramedullary AML often achieve strong initial responses to treatment but experience worse overall survival [3].

CASE

A 76-year-old woman with a past medical history of congestive heart failure, hypertension, atrial fibrillation status post Watchman with a history of stroke, and normocytic anemia presented with persistent shortness of breath and dyspnea.

These symptoms were originally suspected to be recurrent subacute/acute congestive heart failure, with a chest x-ray showing a persistent right sided pleural effusion. She underwent a thoracentesis. Pathology was concerning for a CD34 positive myeloblastic population. Findings were most consistent with an extramedullary manifestation of an underlying high grade myeloid neoplasm, most consistent with AML with monocytic features.

Besides a history of anemia dating back to 2023 there were no other cytopenias.

Bone marrow biopsy was also consistent with 70% blasts with monocytic features and trilinear dysplasia at the time of diagnosis.
Notable mutations included a DNMT3A VAF 46% and TET2 VAF 48% and ATM VAF 42%.

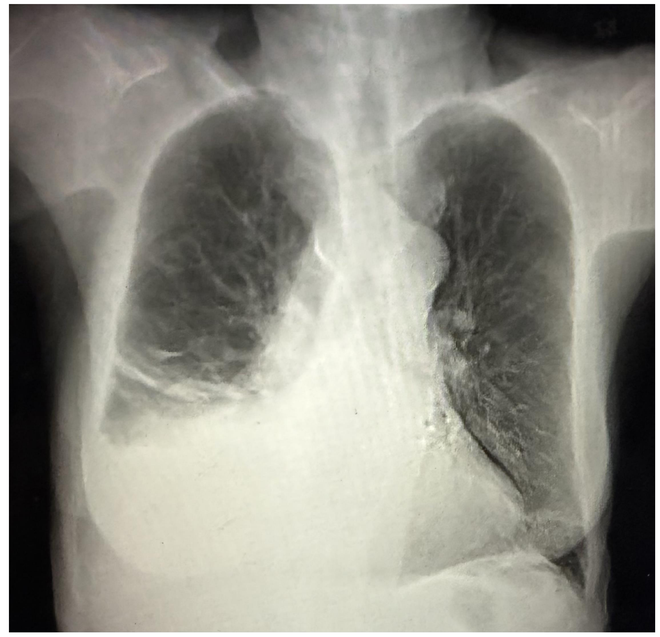
She was started on Azacitidine and Venetoclax. Her pleural effusion subsided. After her second cycle repeat bone marrow biopsy was measurable residual disease (MRD) negative. Her course was complicated by drug-induced liver injury secondary to Venetoclax.

She developed circulating peripheral blasts and worsening cytopenias. Azacitidine was continued, but blast count continued to rise. Azacitidine was eventually discontinued and transfusion support was continued for symptomatic benefit.

Extramedullary manifestations of Acute Myeloid Leukemia, specifically pleural effusions are rare.

Overall survival and prognosis is driven by underlying cytogenetics, molecular profile, and response to treatment rather than extramedullary disease site.

FIGURE 1



Right pleural fluid, flow cytometry analysis: An aberrant CD34-positive myeloblastic population is identified (these findings are most supportive of an extra-medullary manifestation of an underlying high grade myeloid neoplasm) most likely acute myeloid leukemia with monocytic features

CONCLUSION

Pleural involvement by AML is a rare extramedullary manifestation, and presenting as the initial finding is uncommon. Extramedullary involvement can complicate disease assessment and management, but prognosis remains driven by the biologic features of AML and response to therapy.

Research shows conflicting views regarding clinical outcomes in patients with extramedullary disease. Often representing high-risk disease with poor long-term outcomes even despite strong initial response [3].

Intermediate risk AML has a median overall survival typically ranging from 10.6 to 16.8 months depending on age, cohort composition, and treatment intensity per ELN 2022.

CITATIONS

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