A Rare Case of T-Cell Lymphoproliferative Disorder with ETP-ALL Like Phenotype and Pleural Fluid Involvement in a Patient with Positive Sickling Test

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Abstract:

Background: T-cell lymphoproliferative disorders, particularly those with an early T-cell precursor (ETP)-acute lymphoblastic leukemia (ALL)-like phenotype, present a significant diagnostic challenge due to overlapping immunophenotypic features with other acute leukaemia's and T-cell lymphomas. Sickling test was positive. Serous cavity involvement, although rare, represents a clinically significant manifestation that warrants attention.

Case Presentation: A 19-year-old male presented with fever and shortness of breath for 10-12 days. Sickling test was positive. Serial blood counts showed marked leucocytosis, peaking at 130.74 × 10^3/µL, and severe thrombocytopenia, with platelet counts as low as 32 × 10^3/µL. Peripheral blood examination revealed marked leucocytosis with thrombocytopenia and circulating atypical/blast cells. Flow cytometry identified a T-cell lymphoproliferative disorder with an ETP-ALL-like phenotype. The abnormal population showed T-lineage expression, including CD7 positivity and subset CD3 positivity, while CD34, TdT, and CD1a were absent, with bright CD45 expression. Imaging revealed bilateral pleural effusions and ascites. The right pleural fluid was hemorrhagic, with a total leukocyte count of 965 cells/µL, predominantly lymphocyte-mononuclear cells, and numerous atypical cells. Pleural fluid LDH was markedly elevated at 3185.1 U/L.

Conclusion: This case highlights the diagnostic complexity of T-cell lymphoproliferative disorders with an ETP-ALL-like phenotype and emphasizes integrating peripheral blood smear morphology, flow cytometry, imaging, and pleural fluid cytology. The positive sickling test is an important finding in this case. Recognition of atypical cells in a hemorrhagic pleural effusion may provide an important clue to serous cavity involvement and may have implications for diagnosis and clinical management.