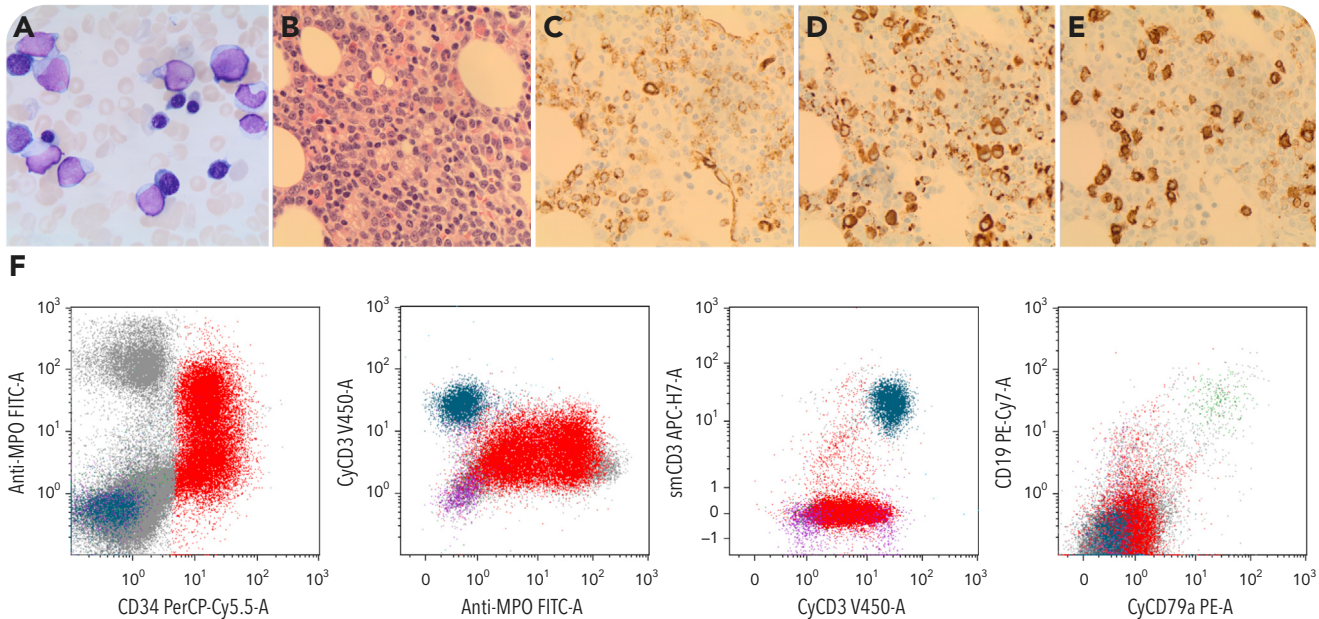


T/myeloid MPAL with biallelic *CEBPA* mutations

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A 72-year-old man presented with anemia and fatigue without hepatosplenomegaly or lymphadenopathy. Complete blood cell count showed severe pancytopenia with few circulating blasts. The bone marrow aspiration was hemodiluted with reduced trilineage hematopoiesis and 30% blasts (panel A; original magnification $\times 1000$; Wright-Giemsa stain; the trephine biopsy revealed hypercellularity with significantly increased blasts (panel B). By immunohistochemistry, CD34⁺ blasts (panel C; original magnification $\times 600$) were myeloperoxidase (MPO) positive (in a subset) (panel D; original magnification $\times 600$) and CD3⁺ (in a subset) (panel E; original magnification $\times 600$). Flow cytometry (panel F) demonstrated that the blasts (red) were CD34⁺/MPO⁺/CD117⁺/HLA-DR⁺/CD13⁺/CD33⁺/CD7 (dim), also cytoplasmic CD3 (cCD3⁺) (intensity reaches that of normal T cells), TdT⁺, and CD99⁺; CD19⁻ and cytoplasmic CD79a (cCD79a⁻). Cytogenetic studies

revealed a normal karyotype. Next-generation sequencing detected mutations for biallelic *CEBPA* (c.992T>C [p.Leu331-Pro] allele frequency (AF): 30%; c.68dupC [p.His24Alafs*84] AF: 21%); *CUX1*, *ASXL1*, *SETBP1*, *SRSF2*, and *TET2*. A diagnosis of mixed phenotypic acute leukemia (MPAL) T/myeloid, with mutated *CEBPA* was rendered.

T/myeloid MPAL is an extremely rare entity generally with poor prognosis. Recent sequencing studies have identified transcription factor *CEBPA* mutations in a subset of T/myeloid (T/M) MPAL but not in B/myeloid (B/M) MPAL or other types of MPALs, suggesting that *CEBPA* may play a role in the pathogenesis of the disease. Although biallelic *CEBPA* mutations defining a specific subtype of acute myeloid leukemia confer a favorable outcome, its clinical impact in T/M MPAL is unclear.