ANSWER

Diagnosis: Acute promyelocytic leukemia, microgranular variant

Summary of immunophenotype:

- **Positive** for CD13, CD34, CD33, cMPO, CD56, CD64 (partial),
- **Negative** for cCD3, CD11b, CD16, CD19, CD117, HLA-DR (predominantly), TdT

Acute promyelocytic leukemia (APL) with t(15;17)(q22;q12); PML-RARA accounts for 5-8% of AML cases. In addition to hypergranular variant, there is also "microgranular" variant. This specific case has typical morphology of microgranular APL, i.e. many bi-lobed, or "buttock", cells. However, the flow cytometric immunophenotype has several atypical features. First, the SSC of the blasts are not high. Second, the intensity of cytoplasmic MPO is not bright.

The diagnosis is confirmed by the detection of t(15;17) translocation, per OSH pathologist.

The authors would like to borrow a portion from a paper [1] to reiterate the key points in handling potential APL cases:

- Recognize value and rapidity of morphologic and cytochemical MPO staining in APL, which is the most rapid diagnostic modality.
- Typical morphology for either classic or microgranular APL is sufficient for alerting clinicians with a presumptive diagnosis of APL prior to ancillary studies.
- Maintain a high index of suspicion for APL, especially in cases in which the WBC is low with easily overlooked rare hypergranular promyelocytes.
- APL should also be considered in leukemia cases with a monocytic appearance.
- Recognize that APL cases can manifest "atypical" morphology; cytochemical MPO can prompt consideration of APL.
- Recognize that t(15;17) of APL may be cryptic by FISH and cytogenetics (<10% of cases).
- If morphology strongly supports APL, negative FISH/cytogenetics should prompt molecular testing before APL is excluded.
- Maintain clinical laboratory testing systems to promote rapid identification of potential APL cases in conjunction with rapid communication to providers.

Reference:

1. Foucar K, Anastasi J. Acute Myeloid Leukemia With Recurrent Cytogenetic Abnormalities. Am J Clin Pathol. 2015 Jul;144(1):6-18.