MAYO CLINIC LABORATORIES

Acute Myeloid Leukemia: Testing Algorithm

Clinical suspicion for acute leukemia (peripheral blood vs bone marrow)

YES

Order standard testing:
- LCMS / Leukemia/Lymphoma Immunophenotyping, Flow Cytometry, Varies (triage, acute panel)
- CHRBM / Chromosome Analysis, Hematologic Disorders, Bone Marrow
- Cytochemical stains as determined by reviewing pathologist

*If a complete flow cytometric analysis has been performed on peripheral blood (≥20% blasts), repeat only if protocol requirement or immunophenotype is unclear

Diagnostic criteria met for acute myeloid leukemia (AML)

YES

Possible acute promyelocytic leukemia (APL), follow Acute Promyelocytic Leukemia: Guideline to Diagnosis and Follow-up

Genetic testing for prognostic and therapeutic purposes

Order the appropriate genetic testing on all AML cases:
- FLT / *FLT3* Mutation Analysis, Varies
- NGSHM / OncoHeme Next- Generation Sequencing for Myeloid Neoplasms, Varies (including: *CEBPA, NPM1, IDH1, IDH2*, etc)
- NGAML / Next-Generation Sequencing, Acute Myeloid Leukemia, 11-Gene Panel, Varies
- NGAMT / Next-Generation Sequencing, Acute Myeloid Leukemia, Therapeutic Gene Mutation Panel (*FLTS3, IDH1, IDH2, TP53*), Varies

Consider baseline molecular minimal residual disease (MRD) testing for *NPM1*, FISH probe testing for inv(16), or FISH probe testing for t(8;21), if applicable.

Reflexive testing performed based on initial pathologic and genetic findings:
- In the event of an unsuccessful/ambiguous cytogenetic result the appropriate AML fluorescence in situ hybridization (FISH) is performed based on patient age:

Adult (≥31 years)
- AMLAF / Acute Myeloid Leukemia (AML), FISH, Adult, Varies

Pediatric (≤30 years)
- AMLPF / Acute Myeloid Leukemia (AML), FISH, Pediatric, Varies

- Monocytic differentiation: Specify FISH probes for *KMT2A* (11q23) and inv(16), order AMLMF / Acute Myeloid Leukemia (AML), Specified FISH, Varies
- Morphologic suspicion of abnormal eosinophils: Specify FISH probes for inv(16) MYH11(R)/CBFB(G), order AMLMF
- For core-binding factor AML: Specify FISH probes for t(8;21) or inv(16), order AMLMF. Also order KITE / *KIT* Mutation Exons 8-11 and 17, Hematologic Neoplasms, Sequencing, Varies or NGAML if NGSHM was not performed

NO

Follow World Health Organization criteria for further evaluation and subclassification

NO

Acute leukemia, NOT AML, consider:
- B-cell acute lymphoblastic leukemia (ALL)
- T-cell ALL
- Blastic plasmacytoid dendritic cell neoplasm

Question acute leukemia ambiguous lineage
- Follow Acute Leukemias of Ambiguous Lineage Testing Algorithm

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