Acute Leukemias of Ambiguous Lineage

Testing Algorithm

Order the following:
- LCMS / Leukemia/Lymphoma Immunophenotyping, Flow Cytometry, Varies
- CHRBM / Chromosome Analysis, Hematologic Disorders, Bone Marrow*
- Cytochemical stains may be performed as determined by reviewing pathologist

Acute leukemias of ambiguous lineage (ALAL)
- Negative for: Myeloperoxidase (MPO), cCD3, cCD22,cCD79a, or strong CD19
- Often positive for: HLA DR, CD34, and/or CD38
- One positive or no expression of: CD13, CD33, CD117
- Exclude erythroid/megakaryocytic lineages and other malignancies

Additional testing needed, order:
- NGSHM / OncoHeme Next Generation Sequencing for Myeloid Neoplasms, Varies
- FISH for (t(9;22) and KMT2A
- FLT / FLT3 Mutation analysis, Varies

Phenotypic characteristics:
- MPO expression
- OR
- Monocytic differentiation with 2 or more of the following expressed: non specific esterase, CD11c, CD14, CD64, lysozyme
- AND
- Strong CD19 with 1 or more of the following strongly expressed: CD79a, cCD22, CD10
- OR
- Weak CD19 with 2 or more of the following strongly expressed: CD79a, cCD22, CD10

Acute myeloid leukemia (AML)
- B-cell acute lymphoblastic leukemia/lymphoma (BALL)
- T-cell acute lymphoblastic leukemia/lymphoma (TALL)
- Blastic plasmacytoid dendritic cell neoplasm (BPDCN)

Additional testing needed, order:
- TALL FISH panel test based on age:
  - Adult (≥31 years)
    - TALAF / T Cell Acute Lymphoblastic Leukemia/Lymphoma (ALL), FISH, Adult, Varies
    - Pediatric (≤30 years)
      - TALPF / T Cell Acute Lymphoblastic Leukemia/Lymphoma (ALL), FISH, Pediatric, Varies
  - NGSHM
  - FLT
  - Consider immunohistochemistry (IHC) for: CD10, CD19, CD20, CD22, CD79a, PAX5, MPO

Undifferentiated

B cell/myeloid

T cell/myeloid

Phenotypic characteristics:
- MPO expression
- OR
- Monocytic differentiation with 2 or more of the following: non specific esterase, CD11c, CD14, CD64, lysozyme
- AND
- Cytoplasmic CD3 expression
- OR
- Surface CD3 (rare in ALAL)

Additional testing needed, order:
- BALL FISH panel test based on age:
  - Adult (≥31 years)
    - BALAF / B Cell Acute Lymphoblastic Leukemia/Lymphoma (ALL), FISH, Adult, Varies
    - Pediatric (≤30 years)
      - BALPF / B Cell Acute Lymphoblastic Leukemia/Lymphoma (ALL), FISH, Pediatric, Varies
  - NGSHM
  - FLT
  - Consider immunohistochemistry (IHC) for: cCD3, MPO

*If CHRBM results are insufficient, consider AML FISH testing. For adult patients (≥31 years), order AMLAF / Acute Myeloid Leukemia (AML), FISH, Adult, Varies; for pediatric patients (≤30 years), order AMLPF / Acute Myeloid Leukemia (AML), FISH, Pediatric, Varies

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