Eosinophilia: Bone Marrow Diagnostic Algorithm

Eosinophilia identified via routine evaluation. Evaluate for secondary causes of eosinophilia. Was a secondary cause found?

YES

Disease-specific workup

Evaluate for secondary causes of eosinophilia.

NO

Assess peripheral blood/bone marrow (BM) morphology

Morphologic features of other hematologic disease: eg, mastocytosis, myeloid neoplasm, lymphoma

Disease-specific workup

Chromosome and fluorescence in situ hybridization (FISH) results**

Order*:
- PATHC / Pathology Consultation on BM biopsy for immunohistochemistry (IHC) tryptase or CD117, and CD25
- KITVS / KIT Asp816Val Mutation Analysis, Varies
- CHRBMC / Chromosome Analysis, Hematologic Disorders, Bone Marrow
- EOSMF / Chronic Eosinophilia, Specified FISH, Varies and specify the CHIC2 probe set
- EXHR / Hematologic Disorders, DNA and RNA Extract and Hold, Varies
- T-Cell panel by flow cytometry

Consider:
- TCGBM / T-Cell Receptor Gene Rearrangement, PCR, Bone Marrow

Abnormal T-cell phenotype and clonal T-cell receptor gene rearrangement

Spindled CD25 positive mast cells and KIT Asp816 Val alteration

Chromosome and fluorescence in situ hybridization (FISH) results**

FISH-positive for FIP1L1-PDGFRA
Abnormal chromosome analysis and confirmatory FISH showing rearrangement of:
- 4q12 (PDGFA)
- 5q32 (PDGFB)
- 8p11.23 (FGFR1)
- 9p24.1 (JAK2)
- 9q34 (ABL1)

Consider chronic eosinophilic leukemia, not otherwise specified

Consider the following diagnoses:***
- Reactive eosinophilia
- Idiopathic hypereosinophilia
- Idiopathic hypereosinophilia syndrome

No clonal abnormality

Consider lymphocytic variant hypereosinophilic syndrome

Mastocytosis workup

See Mast Cell Disorder: Diagnostic Algorithm, Bone Marrow

Increased eosinophils and precursors only

Myeloid neoplasm with:
- PDGFRB rearrangement
- FGFR1 rearrangement
- PCM1-JAK2 abnormality

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- PDGFRB rearrangement
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Other clonal myeloid abnormality

Other clonal myeloid abnormality

Trisomy 8, deletion 20q, and -Y as sole abnormalities do not necessarily implicate the presence of a clonal myeloid disease

Consider the following diagnoses:***
- Reactive eosinophilia
- Idiopathic hypereosinophilia
- Idiopathic hypereosinophilia syndrome

*Do NOT routinely order the following: BCR/ABL1 FISH or PCR, FISH for PDGFRB or FGFR1, mast cell flow cytometry

**Detection of the t(5;14)(q31;q32) [IGH/IL3] mutation is associated with B-lymphoblastic leukemia with reactive eosinophilia.

***If there is significant dysplasia (hypercellularity, few odd megakaryocytes, ring sideroblasts, etc.), consider adding next-generation sequencing and FISH for PDGFRB, FGFR1, ABL1, and JAK2, as rarely these may be cryptic.