

Key:

- morphology
- + blood counts
- clinical findings
- pathophys. &
- underlying cause

Acute Leukemias

≥ 20% blasts
 pancytopenia
 ↑ WBC
 blood chem. abn.
 bone pain
 dx:
 • CBC w/ diff.
 • bone marrow bx
 • flow cytometry
 • cytogenetic + molecular analysis

Lymphoid - ALL

B-lymphoblastic leukemia OR T-lymphoblastic leukemia
 commonest childhood cancer
 M>F
 rapid onset: bone pain, CNS, testes

Myeloid - AML

Auer rods, flow cytometry, enzyme stains

Recurrent Genetic Abnormalities

- + $(8;21)$ - core binding factor
good prognosis
- inv (16) or + $(16;16)$ - core binding factor
abn. marrow eos.
good prognosis
- + $(15;17)$ - PML/RAR α
defective retinoic acid receptor
bilobed promyelocyte
tx w/ ATRA → good prognosis
- 11q23 abn. - histone protein
poor prognosis

AML-NOS

- AML - minimally differentiated
- AML w/out maturation (<10% maturing)
- AML w/ maturation (>10% maturing)
- Acute myelomonocytic leukemia
- Acute monoblastic/monocytic leukemia
- Acute erythroid leukemia
- Acute megakaryoblastic leukemia

Myelodysplasia-related

morphologic dysplasia
 hx of prior MDS
 w/ MDS type CG abn.

Therapy-related

chromosome 5,7 loss → alkylating agent related
 11q23 rearrangement → topoisomerase related
 poor prognosis

Normal Karyotype AML:

- FLT-3 dup. - bad prognosis
- NPM1 mut. - good prognosis
- CEBPA mut. - good prognosis

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Chronic Leukemias

Myeloid

wbc, rbc, plt

splenomegaly
cell proliferation + maturation
marrow hypercellularity
↑ CBC
tyrosine kinase driven (BCR-ABL, JAK2)
may progress to fibrosis

Lymphoid

CLL / SLL

M>F, >50 y.o.
indolent, may be asymptomatic
splenomegaly
p53 del. → bad prognosis
cytopenia, "soccer ball" chromatin
immune dysfn → (+) Coombs 15%
hypogammaglobulinemia 50%

Chronic Myeloid Leukemia

age 26-60
↑ immature WBC
≤ 5% blasts
eosinophilia, basophilia
+ (9;22): BCR-ABL
Ph chromosome
→ doesn't block maturation #
untreated → ↑ blasts
myeloid OR lymphoid crises

Chronic Idiopathic Myelofibrosis

adults
sx from marrow failure
JAK2 mut. ~50%
related to growth factors released by abnormal megakaryocytes
anemia w/ teardrop cells
leukoerythroblastosis
(immature rbc/wbc)

Essential Thrombocythemia

indolent
thrombotic + hemorrhagic episodes
exclude PV, CML, MDS, reactive thrombocytosis
↑ plt, ↑ enlarged mature megakaryocytes
JAK2 mut. ~50%

Polycythemia Vera

HSM, hyperviscosity
thromboses/infarcts
headache, dizziness
JAK-2 mut. > 95%
↑ red cell mass
↑ Hg, Hct
↑ EPO
exclude 2° + relative

Hairy Cell

M>F >40 y.o.
splenomegaly
BRAF mut. common
pancytopenia
"fried egg" appearance

Myelodysplastic Syndrome

adults >50, may occur after chemo, may progress → AML
exclude vit. def., reversible cause
clonal stem cell disorder w/ ineffective hematopoiesis,
dyspoiesis, <20% blasts
hypercellular marrow, pancytopenia
infxns, anemia, bleeding
many causes, therapy-related has worst prognosis

Leukocytosis

Neutrophilia
infxn, steroids, iapi, inflammation

Lymphocytosis
virus

Leukemoid reaction
↑ WBC w/ immature granulocytes
infxn, toxic changes

Leukoerythroblastic reaction
immature grans + nucleated rads, teardrops
marrow-replacing processes

Eosinophilia
parasites, allergy, drug rxn, lymphoma, NPN

Basophilia
MPN, renal failure

Monocytosis
chronic infxns (TB, IBD, collagen vascular dz)

Leukopenia

Neutropenia
drug effcts
accelerated removal

Lymphopenia
less common
Hodgkin lymphoma
immuno deficiency