

CHRONIC MYELOID LEUKAEMIAS

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Course title: Advanced Hematology

MLS-HEMA-324

2019-2020

Chronic Myeloid Leukaemia (CML)

- **Pathophysiology:**
- **Chronic myeloid leukemia (CML) is caused by a reciprocal translocation between the long arm of chromosome 9 and the long arm of chromosome 22 [t(9;22)]**

- The resulting chromosome is known as the Philadelphia chromosome (Ph1).
- The translocation results in fusion of of the *abl gene on chromosome 9* and the *bcr gene on chromosome 22*.
- This fusion gene *codes for a fusion protein which acts as an oncogene*.

CML Phases

- **CML classically occurs in three phases:**
- **1- Chronic phase**
- **2- Accelerated (transformation) phase**
- **3- Blast crisis (acute) phase**

Epidemiology

- **CML occurs at all ages, but predominantly in older adults.**
- **There is a slight male predominance.**
- **CML has been linked to exposure to ionizing radiation; no other predisposing factors are known.**

Laboratory Δ of CML

- **1- CBC:**
- - TWBC: ranges from $\sim 25,000/L$ to $>300,000/\mu L$.
- - Anemia
- - Thrombocytosis (in ~ 30 to 50% of Patients), and the platelet count can exceed $1,000,000/\mu L$.

- ***Peripheral Blood Picture:**
- - **Marked granulocytosis including all stages of granulocytic maturation, from blasts to segmented neutrophils with the predominance of more mature forms.**

- - **Myeloblasts:** are typically only 1 to 2% of WBCs and are always <10% in the chronic phase.
- - **Basophils:** *are always increased.*

- **Eosinophils:** are also frequently increased, but monocytes are NOT.
- **Nucleated RBCs:** may be present.

- **2- Biochemical tests:**

- **1- Increased:**

- **Lactic dehydrogenase (LDH)**

- **Uric acid**

- **Vitamin B12**

- ***2- Decreased:***

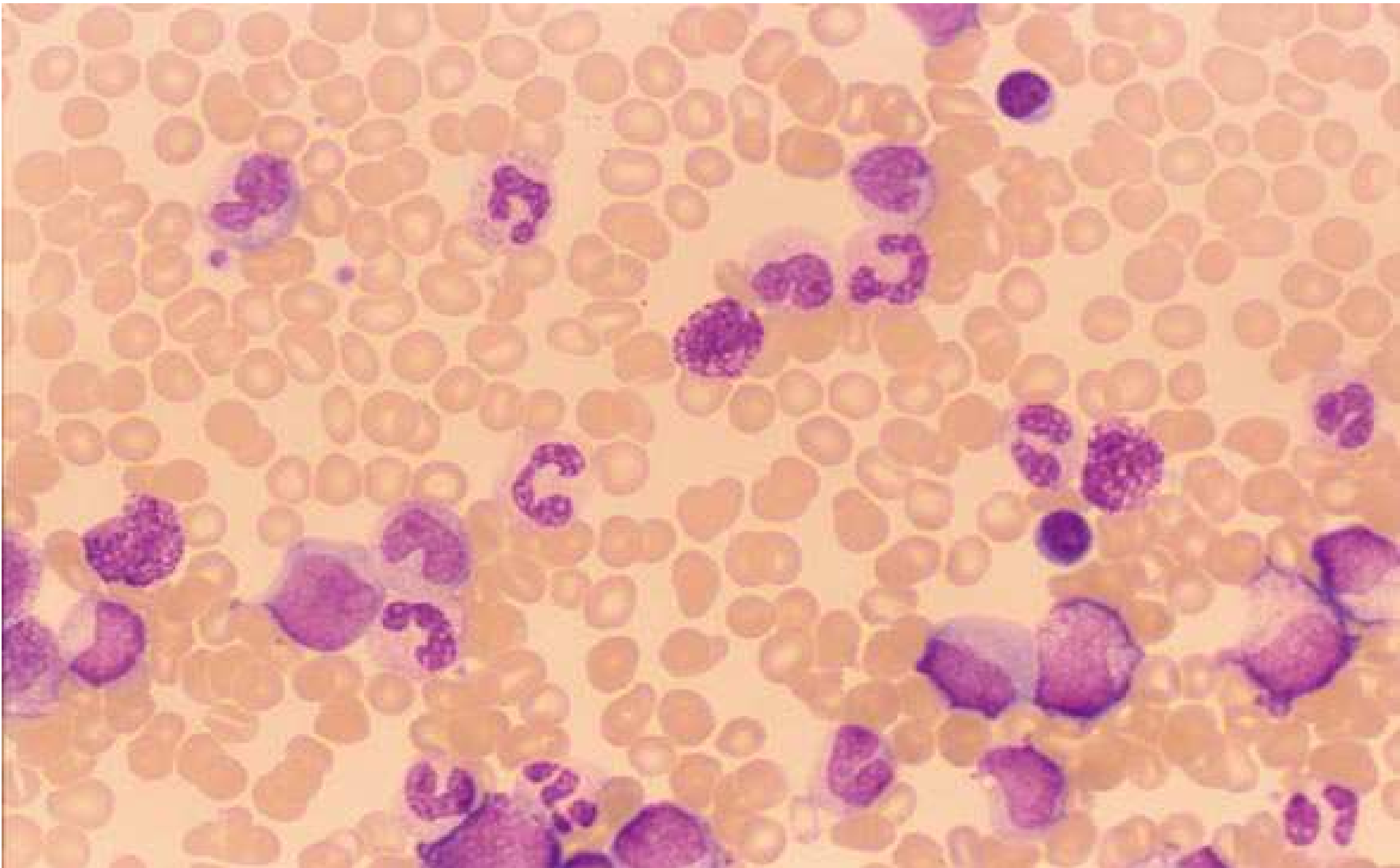
- **Leukocyte Alkaline Phosphatase (LAP or NAP)**

- **However, the LAP in CML can increase with infections,**
- **treatment, and ...**
- **with progression to the accelerated phase or blast crisis.**

- **3- Bone Marrow:**
- **The bone marrow in CML is hypercellular.**
- **Myeloblasts: <10% in the chronic phase**
- **Megakaryocytes: increased in number**
- **There may be marrow fibrosis.**

- **4- Cytogenetics:**
- **The Philadelphia chromosome is present in ~85 to 95% of cases.**
- **If there is no Philadelphia chromosome in cytogenetics, and no evidence of a bcr/abl rearrangement by molecular tests, then the diagnosis is **not CML!****

CML: All stages of granulocyte maturation are present, with a predominance of mature forms; several basophils are present.



Differential Diagnosis

Lab. Finding	CML	Leukemoid Reaction
Dominant cell type	Immature cells	Mature cells
Basophilia	Present	Absent
LAP score	Decreased	Increased
Philadelphia chromosome	Present	Absent

THANK YOU

