Hematology

438 teamwork

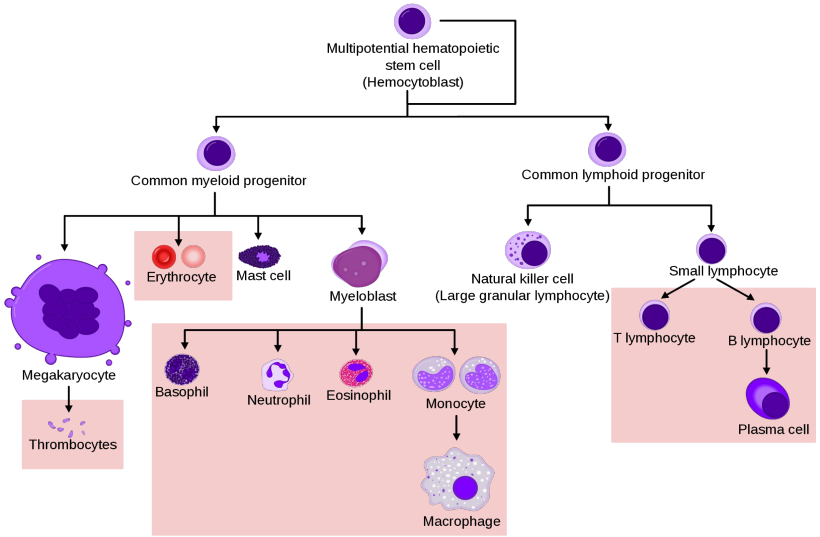
Chronic Leukemia

Color index:
Red: Important
Gray: notes
Blue: extra

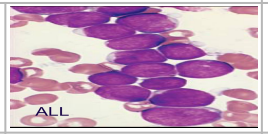
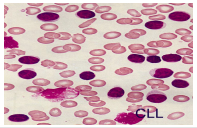
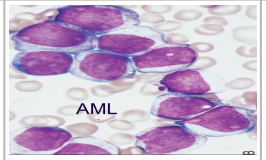
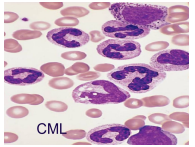
Editing file

Chronic leukaemia

- Heterogeneous group of hematopoietic neoplasms.
- It is uncontrolled proliferation and decreased apoptotic activity with variable degrees of differentiation.
- Composed of relatively mature cells.
- Indolent. (If untreated, the course is in months or years).
- Occurs mainly in adults
- Types : MPN , MDS , MPN/MDS.



Main types of leukemia

	Acute		Chronic	
Lymphoid	ALL		LPN(CLL)	
Myeloid	AML		MPN/MDS (CML)	
Mixed	Acute Biphenotypic			
Non	Acute			

Myeloid proliferative neoplasms (MPN)

- Malignant proliferation of myeloid cells (maturing cells) which are mainly granulocytes, in blood and bone marrow.
- Slow onset and long course.
- Occurs mainly in adults.

Features:

01 **Cytosis** (increasing WBCs)

02 **Organomegaly (mainly splenomegaly)**

03 **High uric acid**

04 **Hypercellular Bone marrow**

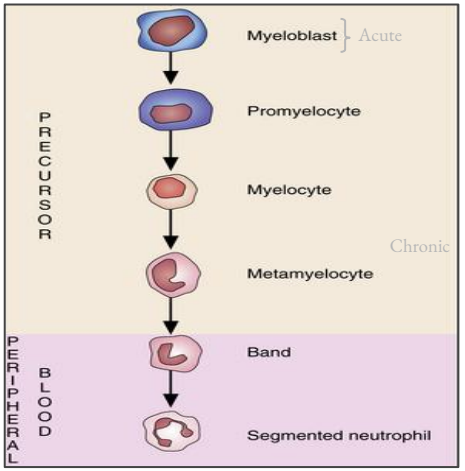
05 **Progression to acute leukaemia (Mainly AML)**

→ Pathoma

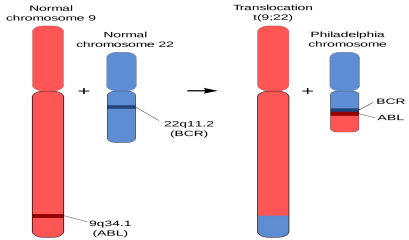
Chronic myeloid leukemia can transform to AML (⅔ of cases) or ALL (⅓ of cases) since mutation is in a pluripotent stem cell.

Chronic myeloid leukemia (CML)

- Stem cell MPN.
- Predominant proliferation of granulocytic cells.
- Consistently associated with the **BCR-ABL1** fusion gene, located in the Philadelphia (Ph) chromosome which results from **t(9;22).**
- If the mutation happened at (myeloblast) it is AL, otherwise it will be CL especially neutrophils.



Pathogenesis:



01

t(9;22) happened

02

BCR-ABL1

02

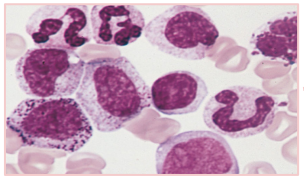
Increase Tyrosine Kinase

03

Activation of signal transduction pathways

04

Uncontrolled proliferation



Clinical presentation of CML

01

Asymptomatic presentation(20-40%)

02

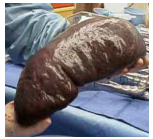
Abdominal discomfort due to splenomegaly

03

Routine CBC : marked leukocytosis (increase in WBCs)

04

Splenomegaly (Massive)

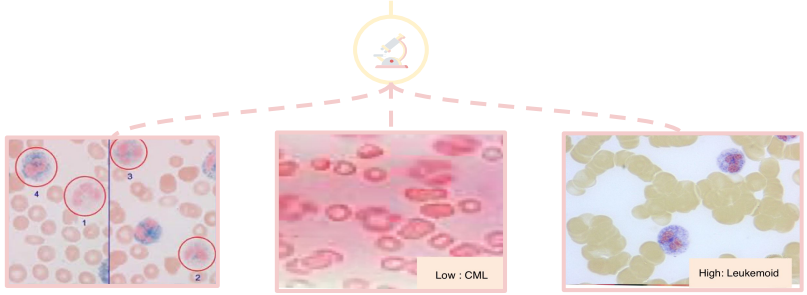


05

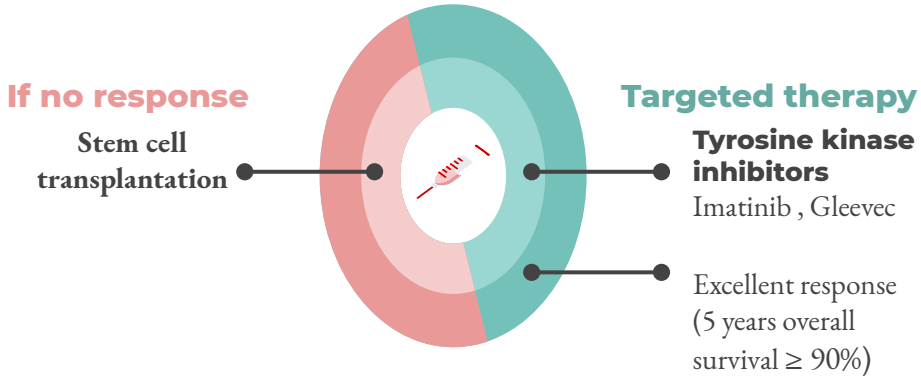
Common symptoms : Fatigue ,weight loss or night sweating

Neutrophil Alkaline Phosphatase (NAP)score:

Cytochemical stain that estimate the amount of alkaline phosphatase enzyme in neutrophils .



Treatment of CML

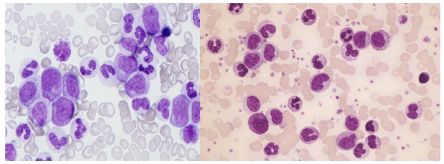


CML phases

01

Chronic phase:

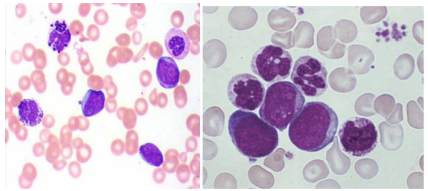
- Leukocytosis (12-1000×10^9/L)
- Mainly neutrophils & myelocytes
- Blasts ≤10% ,Basophils≤ 20%
- Stable course (years)



02

Accelerated phase:

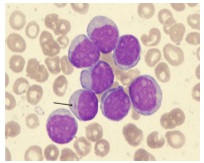
- Increasing counts
- 10-19% blasts (basophils ≥20%)
- Unstable course (months)



03

Blastic phase:

- ≥20% blasts = Acute Leukemia
- 80% AML & 20% ALL
- (coarse: Weeks)



Myelodysplastic Syndromes (MDS)

Group of myeloid neoplasms characterized by:

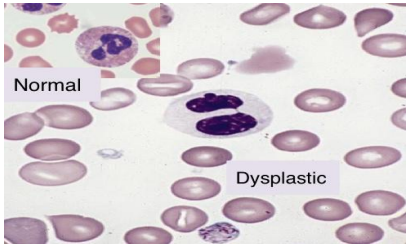
- Peripheral cytopenia (Low HB ± Low WBC & Low PLT).
- Dysplasia (abnormal morphology).
- Ineffective hematopoiesis (hypercellular marrow).
- Progression to AML (preleukaemic disease).
- Enhanced apoptosis.

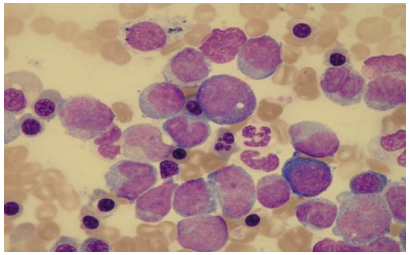
death happens within the BM ie; premature death of RBC, thrombocytes, granulocytes And monocytes.

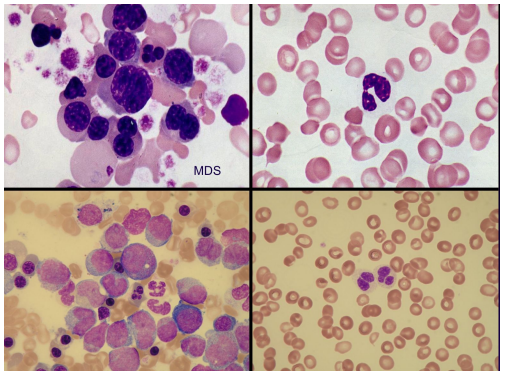
just like CML

Blood: Pancytopenia with dysplasia.

BM: Hypercellular with dysplasia.







Subtypes according to:

Blast count, degree of dysplasia and genetics.

Treatment

Supportive ± chemotherapy.

01

02

03

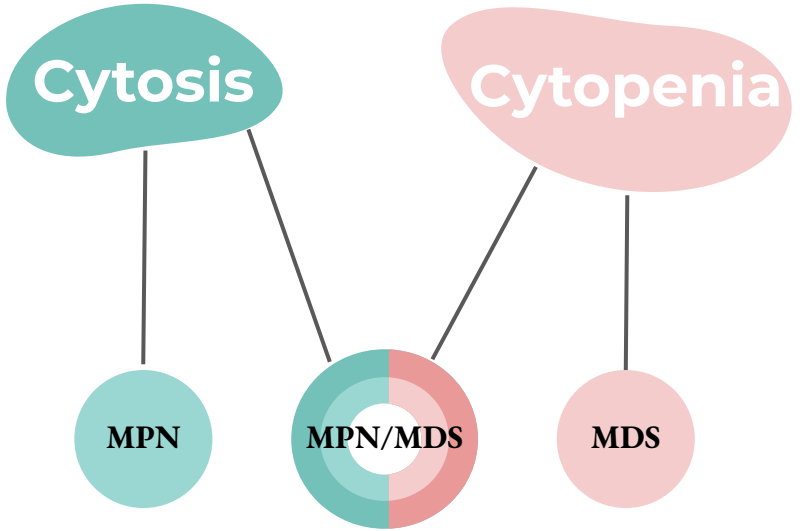
Genetic Abnormalities

Mainly in -5 and -7

↑ Proliferation + ↑ Apoptosis = Ineffective Hematopoiesis

Differential Diagnosis

	CML	Leukemoid
Age	Adult	Any age
WBC count	High	High but < 100,000
Differential	Mainly myelocytes & segmented	Mainly bands
Morphology	Hypogranular	Toxic
Splenomegaly	+	±
NAP score	Low	High
BCR/ABL	+ve	-ve
Onset	Chronic	Acute



1- **Chronic myelomonocytic leukemia:** (**monocytosis** ,BCR-ABL –ve) . N.B chronic myeloid leukemia was mainly granulocytes "neutrophils"

2-**Leukemoid reaction:** Leukocytosis due to physiological response to stress or infection

Chronic Myelomonocytic Leukemia (CMML)

Clonal hematopoietic malignancy characterized by:

- Proliferation of monocytes.
- Proliferation of neutrophils.
- Negative for Philadelphia Chromosome.
- Blast must be less than 20%.

MDS/MPN
The reason why it's called by these two diseases:

MDS Features
Dysplasia & enhanced apoptosis.

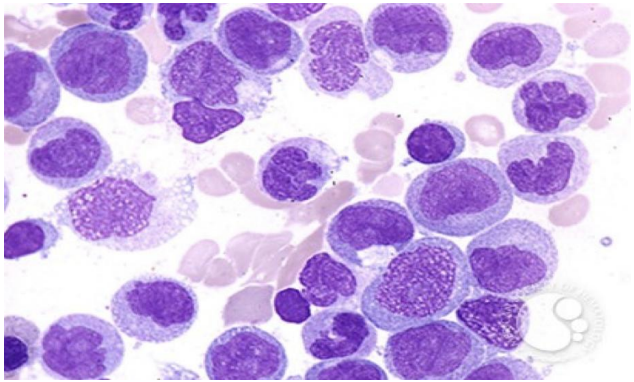
MPN Features
Marked proliferation.

Course

Aggressive course (survival rate around 2.5 years).

Treatment

Chemotherapy ± Stem Cell Transplant (SCT)



Quiz

Key answers:
1-A 2-B 3-B 4- D

1-22 years old male come to ER with splenomegaly; examination show increasing in WBCs and high Uric acid. Microscopic results show hypercellular bone marrow. What's your diagnosis?

A. MPN
B. CML
C. MDS
D. CMML

2- CML associated with

A. BCR-ABL2 fusion gene in Ph chromosome which result from t(9;22)
B. BCR-ABL1 fusion gene in Ph chromosome which result from t(9;22)
C. BCR-ABL1 fusion gene in Ph chromosome which result from t(8;14)
D. BCR-ABL1 fusion gene in Ph chromosome which result from t(9;21)

3- The most important characteristic for CMML

A. Basophil proliferation
B. Monocyte proliferation
C. B lymphocyte proliferation
D. Eosinophil proliferation

4- The most important characteristic for MDS ***(from dr.notes)***

A. HyperCellular bone marrow
B. HypoCellular bone marrow
C. Peripheral blood cyropenia
D. A & C

THANKS

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