

# **ACUTE LYMPHOBLASTIC LEUKEMIA ALL**

# **ACUTE LYMPHOBLASTIC LEUKEMIA (ALL)**

- **Clonal proliferation and accumulation of blast cells in blood, bone marrow and other organs**
- **Disorder originates in single B or T lymphocyte progenitor**
- **Heterogenous disease with different biological subtypes**
- **Incidence in adults : 20% of acute leukemias**
- **Etiology - unknown**

# **Acute leukemias - clinical features**

- 1. Bleeding**
- 2. Fever/infection**
- 3. Bone/joint pain**
- 4. Hepatomegaly**
- 5. Splenomegaly**
- 6. Lymphadenopathy**
- 7. CNS involvement**

# Acute leukemias - laboratory findings (1)

## **Blood examination .1**

,anemia -

,thrombocytopenia -

variable leukocyte count, usually -  
,increased

cells blood morphology: presence of blast -

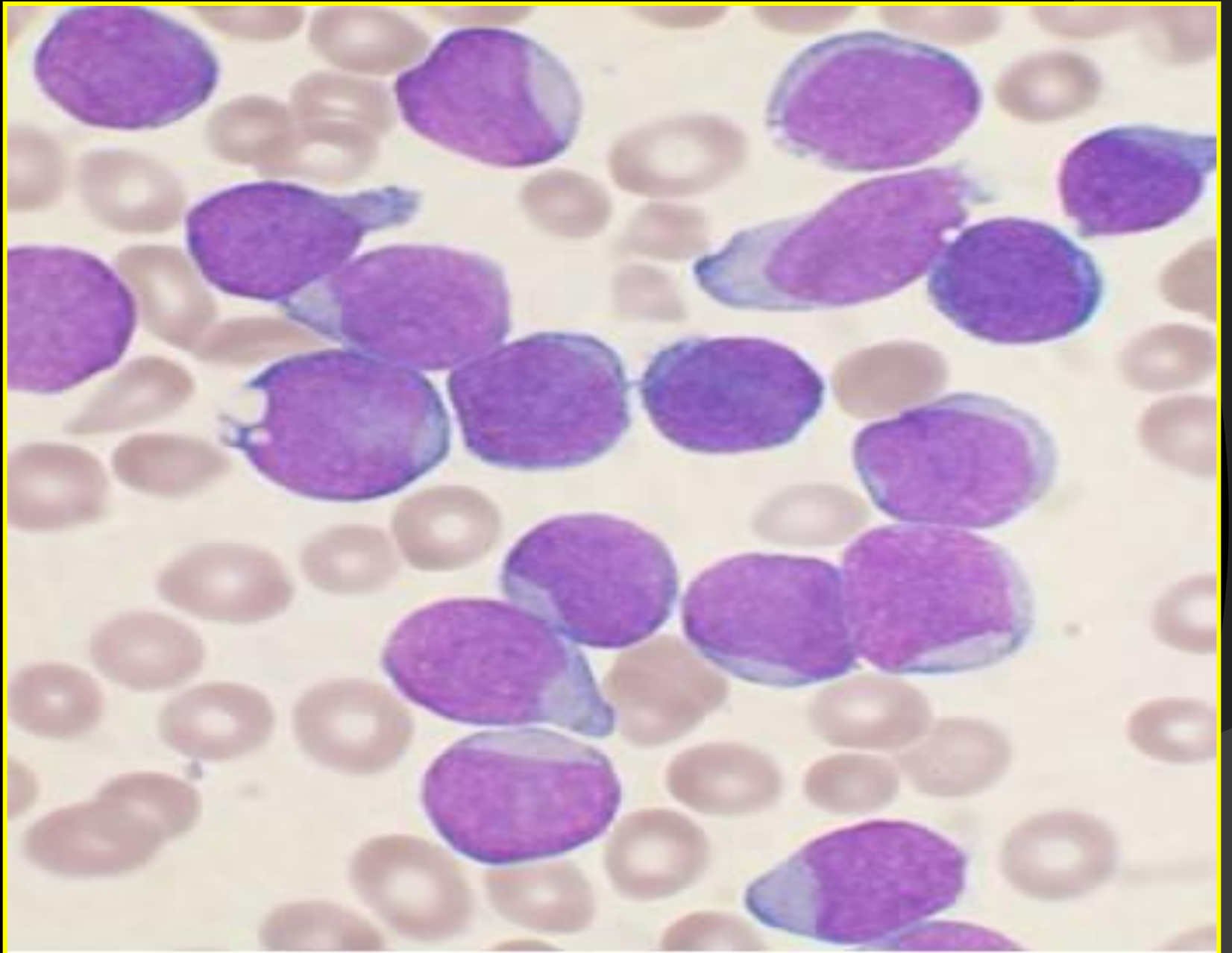
## **Bone marrow morphology .2**

,presence of blast cells -

suppression of normal hematopoiesis -

# **Acute leukemias - Laboratory findings (2)**

- 3. Cytochemical stains**
- 4. Immunophenotyping**
- 5. Cytogenetics**
- 6. Molecular studies**



# Immunologic classification of acute lymphoblastic leukemias

## B- lineage (80%)

## Markers

|          |                                        |
|----------|----------------------------------------|
| Pro-B    | CD19(+),Tdt(+),CD10(-),Cylg(-),        |
| Common   | CD19(+),Tdt(+),CD10(+),Cylg(-),        |
| Pre-B    | CD19(+),Tdt(+),CD10(+),Cylg(+),Smlg(-) |
| Mature-B | CD19(+),Tdt(+),CD10(±),Cylg(±),Smlg(+) |

## T-lineage (20%)

|          |                         |
|----------|-------------------------|
| Pre-T    | CD7(+), CD2(-), Tdt(+), |
| Mature-T | CD7(+), CD2(+), Tdt(+), |

# Chromosomal/molecular abnormalities with prognostic significance in ALL

## Better prognosis

- normal karyotype
- hyperdiploidy

## Poor prognosis

- t (8; 14)
- t (4; 11)

## Very poor prognosis

- t (9; 22); BCR/ABL (+)



# **Risk classification in ALL**

- 1. Standard risk**
- 2. High risk**
- 3. Very high risk**

# High-risk ALL

1. Pre - T
2. Pro - B
3. Age > 35 years,
4. WBC > 30 G/L in B-ALL  
> 100 G/L in T-ALL
5. No remission after 4 weeks of  
induction  
therapy

# **VERY HIGH-RISK ALL**

**Philadelphia Chromosome  
t(9;22)+ or BCR/ABL +**

# **TREATMENT STRATEGY IN ALL**

# In ALL the choice of treatment-strategy depends on

1. Risk qualification
2. Immunophenotype of leukemic cells
  - T lineage,
  - early B lineage,
  - mature B lineage,
3. Age and biological condition
4. Goal of treatment

# Remission induction therapy in ALL

1. Antineoplastic treatment
  - a. Drugs: prednisone, vincristine, asparaginase, cyclophosphamide, 6MP  
daunorubicin/adriamycin/epirubicin, cytosine arabinoside,
  - b. Treatment duration: 4-8 weeks
  - c. No of courses: 1- 2
2. CNS prophylaxis
3. Supportive care
4. Treatment of complications

# **Post-remission therapy in standard-risk ALL**

## **1. Chemotherapy**

**a. Maintenance therapy: 6-mercaptopurine, methotrexate - for 2-3 years.**

**b. Intensification treatment periodically repeated: daunorubicin/adriamycin, prednisone, vincristine, cyclophosphamide.**

## **2. CNS prophylaxis**

# **Post-remission therapy in very high-risk ALL**

**Allogeneic Stem Cell  
Transplantation**



# Treatment results in ALL

## ⊙ Adults

- Complete remission (CR) 80-85%
- Leukemia-free survival (LFS) 30-40%

## ⊙ Children

- Complete remission (CR) 95-99%
- Leukemia-free survival (LFS) 70-80%

# AlloHSCT in ALL

## ◎ Sibling donor

|     | CR1         | >CR2        | relapse/refractory |
|-----|-------------|-------------|--------------------|
| LFS | 51% (21-80) | 34% (13-42) | 20% (12-33)        |
| RR  | 26% (9-50)  | 47% (40-69) | 71% (59-76)        |
| TRM | 29% (12-42) |             |                    |

## ◎ Matched unrelated donor

|     |             |
|-----|-------------|
| LFS | 39% (38-42) |
| RR  | 22% (19-23) |
| TRM | 48%         |

# THE END

