- **Definition of leukemia**: increased WBCs in a malignant pattern (leukocytosis).
- **Risk factors for leukemia include**: radiation, chemotherapy, Down syndrome & viral infections.
- **Leukemias can be:**
  - Acute (AML and ALL).
  - Chronic (CML and CLL).
- Chronic leukemia progress slowly and gradually. The percentage of blast cells is less than 5% while this percentage exceeds 20% in acute leukemia.
- **Clinical presentation of chronic leukemia:**
  - Anemia (normochromic, normocytic).
  - Thrombocytopenia (decreased platelets leading to bleeding).
  - Neutropenia (increasing susceptibility to infections).
  - Hypermetabolic state (fever, weight loss, anorexia &night sweating).
  - Hyperuricemia (due to excessive catabolism of purines and this will lead to gout).
  - **Infiltration of organs:**
    - ✓ Gums hypertrophy and infiltration (monocytic acute myeloid leukemia).
    - ✓ Massive splenomegaly (in CML).
    - ✓ Meningeal syndrome + testicular swelling (in ALL).
  - **Rare manifestations include**: priapism and visual disturbances (due to leukostasis).

CML

- **Presentation:**
  - 40-60 yrs with lethargy, weight loss, anemia (normochromic normochromic), leukostasis (very common), gout and hepatosplenomegaly.
- **Investigations will show**: granulocytic leukocytosis, ↓neutrophils alkaline phosphatase, ↑basophils, ↑uric acid, and bone marrow is hypercelular.
- **CML is characterized by**: the presence of Ph chromosome t(9,22)---> resulting in BCR-ABL1 fusion gene which has increased tyrosine kinase activity leading to increased cell proliferation and preventing apoptosis.
- **There are three phases for CML:**
  - **Phase 1**: mild symptoms, slight splenomegaly, mild anemia and bleeding.
  - **Accelerated phase (2)**: blast cells up to 19% with progressing anemia and bleeding.
  - **Blastic phase (3)**: blast cells reach 20% or more.
- **Management:**
  - Busulfan and hydroxyuria (not used anymore).
  - **α-interferon**: in pregnancy.
  - **Imatinib**: tyrosine kinase inhibitor. Second generations of tyrosine kinase inhibitors are: dasatinib and nilotinib.
  - Allogeneic SCT is considered as an option of treatment.

CLL

- The life span is extended to 20 years or more (considered as a benign condition).
- **Characterized by**: generalized lymphadenopathy. It can also infiltrate the skin and lead to splenomegaly.
- Occurring more in males and presenting at 60 years of age.
- Most cases are discovered incidentally.
- **Investigations**: ↑WBCs, anemia, thrombocytopenia, autoimmune hemolytic anemia (frequent).
- 85% of cases are (B-cell CLL) while 15% are (T-cell CLL).
- **Treatment**: chlorambucil (alkylating agent), rituximab (monoclonal antibodies), corticosteroids (if there is hemolytic anemia), splenectomy (usually not needed) & allogeneic SCT.