

Leukaemia

Definition

Leukaemia is a type of cancer that affects the blood and bone marrow. It is characterized by the overproduction of abnormal white blood cells, which are immature and unable to function properly, leading to a compromised immune system.

Pathophysiology:

The exact mechanisms underlying the development of leukaemia are not fully understood, but they are thought to involve a series of genetic mutations and alterations that occur in the hematopoietic stem cells, which are responsible for producing all blood cells. These genetic changes result in the abnormal proliferation and survival of leukaemia cells, which interfere with the normal production and function of other blood cells.

The pathophysiology of leukaemia involves changes in the DNA and gene expression of the abnormal cells, which alter their ability to differentiate into mature blood cells. These changes can result in the accumulation of immature cells, which can interfere with the production of normal blood cells and lead to a range of complications.

Leukaemia cells can also spread to other parts of the body, such as the lymph nodes, spleen, liver, and other organs. The spread of leukaemia cells can lead to the infiltration and destruction of normal tissue, causing a range of complications depending on the location and extent of the spread.

These cells do not function properly and are not able to fight infections, leading to an increased risk of infection. The overproduction of these abnormal cells also leads to a decrease in the production of normal red blood cells and platelets, leading to anaemia and an increased risk of bleeding.

Types/Forms:

- **Acute lymphoblastic leukaemia (ALL):** ALL is a fast-growing form of leukaemia that affects lymphoid cells, which are a type of white blood cell that helps to fight infections. It is more common in children than adults.
- **Chronic lymphocytic leukaemia (CLL):** CLL is a slow-growing form of leukaemia that affects lymphoid cells. It is more common in adults than children.
- **Acute myeloid leukaemia (AML):** AML is a fast-growing form of leukaemia that affects myeloid cells, which are the precursor cells that give rise to red blood cells, white blood cells, and platelets.
- **Chronic myeloid leukaemia (CML):** CML is a slow-growing form of leukaemia that affects myeloid cells. It is usually diagnosed in adults and progresses slowly at first but can become more aggressive over time.



Types/Forms Cont'd:

- **Hairy cell leukaemia (HCL):** HCL is a rare form of leukaemia that affects B cells, which are a type of white blood cell that produces antibodies. It is characterized by the presence of abnormal cells with hair-like projections.
- **Large granular lymphocytic leukaemia (LGL):** LGL is a rare form of leukaemia that affects lymphoid cells. It is characterized by the presence of abnormal cells with large granules in their cytoplasm.
- **T-cell prolymphocytic leukaemia (T-PLL):** T-PLL is a rare form of leukaemia that affects T cells, which are a type of white blood cell that helps to fight infections. It is characterized by the presence of abnormal cells with a characteristic appearance under the microscope.

Causes:

The exact cause of leukaemia is unknown, but it is believed to be caused by a combination of genetic and environmental factors. Some risk factors include exposure to radiation or chemicals, certain genetic disorders, and a weakened immune system. Different types of leukaemia may have different age and gender distributions. For example, CLL is more common in men, while AML is more common in older adults.

Clinical Manifestations

The symptoms of leukaemia can vary depending on the type and stage of the disease, but they generally include fatigue, weakness, shortness of breath, fever, night sweats, weight loss, swollen lymph nodes, and easy bruising or bleeding.

Diagnostic Criteria:

The diagnosis of leukaemia requires a combination of clinical symptoms, blood tests, and bone marrow biopsy. Blood tests may show an increased number of abnormal white blood cells, decreased red blood cells, and decreased platelets. A bone marrow biopsy can confirm the diagnosis and determine the type and stage of the disease.

Leukaemia Treatment:

The treatment of leukaemia depends on the type and stage of the cancer, as well as the patient's age and overall health. Common treatments include chemotherapy, radiation therapy, targeted therapy, and stem cell transplantation.

Specific generic names of medication used in the treatment of leukaemia include:

- Chemotherapy: Methotrexate, cytarabine, vincristine, doxorubicin, and daunorubicin
- Targeted therapy: Imatinib, dasatinib, and nilotinib
- Stem cell transplantation: Cyclophosphamide, busulfan, and total body irradiation



Contraindications/Cautions:

The use of chemotherapy and radiation therapy can cause side effects such as nausea, vomiting, hair loss, and an increased risk of infection. Patients with pre-existing medical conditions such as liver or kidney disease may be at increased risk of complications. Pregnant women should avoid chemotherapy and radiation therapy, as they can harm the developing fetus.

Gender and Age Differences:

Leukaemia can affect both males and females of any age, but it is most common in adults over the age of 55.

Nursing Assessment:

Nurses should assess the patient's symptoms, including fatigue, fever, and unexplained weight loss. They should also monitor the patient for signs of infection, such as fever and elevated white blood cell count.

Nursing Diagnoses:

- Risk for infection
- Fatigue
- Risk for injury

Nursing Management:

- Monitor the patient's vital signs, including temperature, blood pressure, and heart rate
- Administer medications as prescribed, including chemotherapy and supportive medications such as antiemetics and pain relievers
- Provide emotional support to the patient and family members
- Educate the patient and family members on the signs and symptoms of infection, and how to prevent infection
- Monitor the patient for signs of bleeding or bruising, and provide appropriate interventions as needed

