

Tikrit University

College of Nursing

Clinical Nursing Sciences



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Child Health Nursing



Leukemia

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Leukemia

1. cancer of blood or bone marrow
2. abnormal proliferation of blood cell,
3. usually (over production of immature WBC)
4. Hematological neoplasm.
5. most common malignancy of children < 15 years.
6. Peak incidence at 4 years and more common in male than female.

Classification of Leukemia

1. immunology classification (T-cell or B –cell) ,
2. cytogenetic classification and according to the types and maturation of WBC (morphology).

Classification according to the types and maturation of WBC

- 1- **Acute lymphocyte leukemia (ALL):** most common type in young children.
- 2- Acute myelogenous leukemia (AML): affect adults > children.(**acute non lymphocyte leukemia**).
- 3- Chronic lymphocyte leukemia (CLL). never affects children.
- 4- Chronic myelogenous leukemia (CML). mainly in adults. Few children

What is Acute Lymphocytic Leukemia?

Malignant proliferation of immature leukocytes in the blast stage of maturation (lymphoblasts which is lymphocyte precursors)

In bone marrow or lymph tissue

accumulation in peripheral blood, bone marrow, and body tissues.

About 20% of leukemias are acute.

Pathophysiology

1-Accumulation of immature, non-functioning WBCs (lymphocytes in lymph tissue, granulocytes in bone marrow).

2- Infiltration of immature WBCs then spill into the bloodstream and from there infiltrate other tissues

3- Malfunction. Eventually, this infiltration results in organ malfunction because of encroachment and hemorrhage' Statistics and Incidences

One of the most common forms of acute leukemia is acute lymphocytic leukemia.

1-ALL is more common in males than in females,

Whites (especially in people of Jewish descent),

Children (between ages 2 and 5),

People who live in urban and industrialized areas.

2-80% of all leukemias between 2 and 5 years old are ALL.

3-Acute leukemias account for 20% of adult leukemias.

4-Among children, however, it is the most common form of cancer.

Incidence is 6 out of every 100, 000 people

Clinical Manifestations

1- May be gradual or abrupt.

2- High fever.

3- Abnormal bleeding due to thrombocytopenia

4- Bruising. Easy bruising after minor trauma is a sign of leukemia.

5- Dyspnea. A decrease in the mature blood components leads to dyspnea.

6- Anemia. because of a decrease in mature RBCs.

7- Fatigue.

8- Tachycardia. oxygen-carrying component of the blood decreases

Classification manifestations

- 1- Lack of blood platelets (thrombocytopenia) may become bruised, bleed excessively, or develop pinprick bleeds (petechiae, purpura or nasal bleeding).
- 2- WBC disorders (neutropenia): putting patient at the risk of developing infections.
- 3- RBC deficiency leads to anemia, which may cause dyspnea, fatigue, paler, palpitation, anorexia and headache.
- 4- Fever , chills, and other flu-like symptoms.
- 5- pallor, weakness and fatigue.
- 6- loss of appetite or weight.
- 7- swollen or bleeding gums and mouth sore
- 8- neurological symptoms (headache, vomiting, drowsiness, convulsion and unconsciousness)
- 9- Tissue infiltration such as liver, spleen, CNS, bone and joint.

Causes and risk factors of leukemia

- 1- natural or artificial ionizing radiation.
- 2- Genetic predispositions.
- 3- Certain kinds of chemicals.
- 4- the leukemia increase with identical twins.
- 5- Some viruses .
- 6- the leukemia associated with disorders of the immune mechanisms of the body.

Causes

some combination of viruses, immunologic factors, genetic factors, and exposure to radiation and certain chemicals.

- 1- Congenital disorders. Down syndrome, Bloom syndrome, Fanconi anemia, congenital agammaglobulinemia, and ataxia-telangiectasia predisposes to ALL.
- 2- Familial tendency. Genetics also play a part in the development of ALL.
- 3- Viruses. Viral remnants have been found in leukemic cells

Complications

Untreated, ALL is invariably **fatal**, usually because of complications

Infection. Immature WBCs are not functioning

Organ malfunction. hemorrhage occurs when immature WBCs spill into the bloodstream and other tissues and eventually lead to organ or tissue malfunction.

Assessment and Diagnostic Findings

The diagnosis of ALL can be confirmed with a combination of the following:

- 1- **Bone Marrow Aspiration**. Typically showing a proliferation of immature WBCs confirm ALL.
- 2- **Bone Marrow Biopsy**. posterior superior iliac spine, is part of the diagnostic workup.
- 3- **Complete Blood Counts**. severe anemia, thrombocytopenia, and neutropenia.
- 4- **Differential leukocyte count**. To determine cell type.
- 5- **Lumbar puncture** to detect meningeal involvement.
- 6- **Uric acid levels**. Elevated uric acid levels and lactic dehydrogenase levels (LDH) are commonly found

Medical Management

- 1- Systemic chemotherapy to eradicate leukemic cells and induce remission (less than 5% of blast cells in the marrow and peripheral blood are normal).
- 2- Radiation therapy for testicular infiltrations.
- 3- Platelet transfusion is performed to prevent bleeding
- 4- RBC transfusion to prevent anemia.

Surgical Management

Aggressive treatment may include surgical management through:

- 1- Bone marrow transplant is a choice that can be considered for a ALL patient
- 2- Stem cell transplant in

Nursing Diagnosis

major nursing diagnoses for the patient with ALL may include:

- 1-Risk for infection related to overproduction of immature WBCs.
- 2-Risk for impaired skin integrity related to toxic effects of chemotherapy, alteration in nutrition, and impaired immobility.
- 3-Imbalanced nutrition, less than body requirements, related to hypermetabolic state, anorexia, mucositis, pain, and nausea.
- 4-Acute pain and discomfort related to mucositis, leukocyte infiltration of systemic tissues, fever, and infection.
- 5-Hyperthermia related to tumor lysis or infection.
- 6-Fatigue and activity intolerance related to anemia, infection, and deconditioning.

Nursing intervention

The interventions included in the care plan of the patient follows.

Before treatment:

Education. The nurse should explain the disease course, treatment, and adverse effects.

Infection. how to recognize symptoms of infection such as fever, chills, cough, and sore throat.

Bleeding. how to recognize abnormal bleeding through bruising and petechiae and how to stop it with direct pressure and ice application.

Promote good nutrition. encouraged to eat and drink high-calorie and high-protein foods and beverages because chemotherapy causes weight loss and anorexia

Rehabilitation. establish appropriate rehabilitation program for patient in remission.

The interventions included in the care plan of the patient follows.

Plan meticulous, supportive care:

Meningeal leukemia. Signs of meningeal leukemia (confusion, lethargy, headache) and know how to manage care after intrathecal chemotherapy.

Hyperuricemia. Prevent hyperuricemia, a possible result of rapid, chemotherapy induced leukemia cell lysis through encouraging fluids to 2000 ml daily, giving acetazolamide and sodium bicarbonate tablets, and allopurinol.

Infection control. Control infection by placing the patient in a private room and instituting neutropenic precautions.

Skincare. Provide thorough skin care by keeping the patient's skin and perianal area clean, applying mild lotions and creams to keep skin from cracking and drying, and thoroughly cleaning skin before all invasive skin procedures.

Constipation. Prevent it by providing adequate hydration, a high-residue diet, stool softeners, and mild laxatives, and by encouraging walking.

Mouth ulcers. Control mouth ulceration and gum swelling, and by providing frequent **mouth care and saline rinses.**

Psychological support. Building a trusting relationship to promote communication.

Manage stress. Minimize stress by providing a calm, quiet atmosphere that is conducive to rest and relaxation.

Treatment of leukemia

A- Chemotherapeutic agents and radiation

Treatment of leukemia involves the use of chemotherapeutic agent in three phases of therapy:

1- induction phases:

- ☒ To achieve complete remission or disappear of leukemia cell.
- ☒ **This phase began and lasts 4 to 6 weeks.**
- ☒ Drugs use for induction are **corticosteroids** (prednisone) **vincristine**, and **L-asparagine.**

2- Sanctuary phase or prophylactic therapy:

- ❖ prevents leukemia cell from invading the CNS.
- ❖ By using intrathecal chemotherapy with **Methotrexate** **or** **Cytarabine.**

3- maintenance with intensification therapy (consolidation phase):

- ✚ To maintain the remission phase, began after complete of successful induction and prophylactic treatment.
- ✚ Main treatment is **methotrexate and 6 mercaptopurine, vincristine and prednisone** administered at intervals add to duration of remission.

B- Bone marrow transplantation: Used in treating children with ALL and AML:

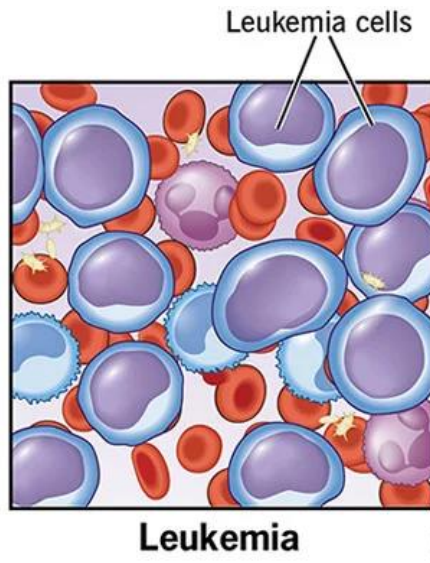
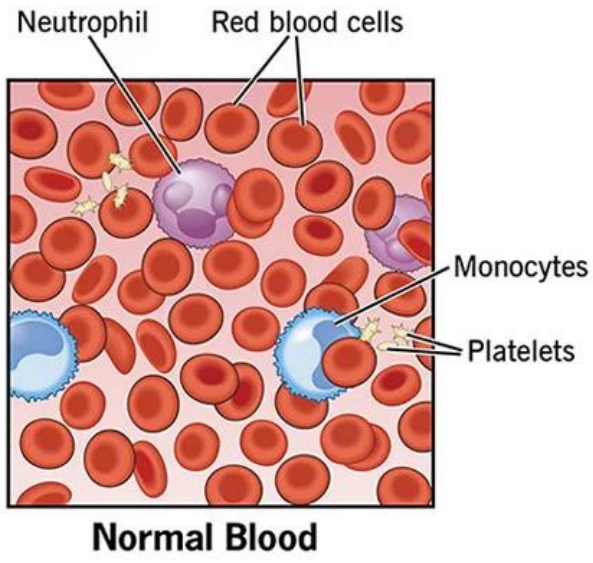
Relapse :

- ❖ Early – Relapse occurs while therapy or during first 6 month .
- ❖ Late – Relapse occurs more than 6 months.

Nursing management

The goals is to

- ❖ Reduce infection of children.
 - ❖ Prevent complications and improve quality of life to these children.
- 1- Detect disease **complications**, chemotherapy **side effect**, and signs and symptoms of **infection**.
 - 2- If blood transfusion **explain** the purposes and procedure to comfort child.
 - 3- If anemia keep him at rest and balanced meals and to prevent malnutrition and anemia.
 - 4- Antiemetic to prevent the nausea and vomiting.
 - 5- Look for hemorrhage such as petechiae and ecchymosis in the skin.
 - 6- Observe general hygiene (oral and skin hygiene) for any inflammation
 - 7- Pain management.
 - 8- Recording of vital signs and body weight.
 - 9- Educate family about diagnosis prognosis and treatment of leukemia.



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