

Assessment and management of patients with hematologic disorder

The hematologic system consists of the **blood** and the sites where blood is produced, including the **bone marrow** and **reticuloendothelial** system.

Blood

The cellular component of blood consists of 3 primary cell types:

Erthrocytes (RBCs)

Leukocytes (WBCs)

Thrombocytes (platelets)

Blood

Component of blood normally make up:

40%-45% of the blood volume.

The adult bone marrow **produces** about

175 billion **erythrocytes** each day

70 billion **neutrophils** and

175 billion **platelets** each day

Blood

Blood make up approximately 7% - 10% of the normal body weight and amount to 5 – 6 L. of volume.

Blood

Blood **circulating** through the vascular system and serving as a link between body organs, blood carries O₂ absorbed **from the** lung and nutrients absorbed from gastrointestinal tract **to the** body cells for cellular metabolism.

Blood

Blood **carries** hormones, antibodies, and other substances to their sites of action or use.

Blood **carries** waste products produced by cellular metabolism to the **lungs**, **skin**, **liver**, and **kidneys**.

Bone Marrow

Is the site of **hematopoiesis**, or the **blood cells formation**.

In adults, **blood cells formation** is usually limited to the **pelvic, ribs, vertebrae**, and **sternum**.

Bone Marrow

Marrow is one of the largest organs of the body, marking up (4% - 5%) of total body weight.

Bone Marrow

The marrow is **highly vascular**. Within it are primitive **cells called stem cells**.

The **stem cells** have the ability to self-replicate, thereby ensuring a continuous supply of stem cells throughout the life cycle.

Stem cells

When **stimulated** to do so, stem cells can begin a process of **differentiation** into either:

Myeloid or

Lymphoid stem cells

Stem Cells

These **stem cells** are committed to produce specific types of blood cells. **Lymphoid stem cells produce** either **T** or **B lymphocytes**.

Stem Cells

Myeloid stem cells differentiate into 3 broad cell types:

Erthrocytes

Leukocytes and
platelets

Reticuloendothelial system (RES)

The reticuloendothelial system (RES)

Is an essential component of the immune system, comprised of **phagocytic cells** located in different organs of the human body.

phagocytic cells

Phagocytic cells are derived from the bone marrow stem cells and become monocytes, which circulate in the blood. Most of these monocytes migrate to different tissues inside the body.

Phagocytic cells

Phagocytic cells capable of **engulfing** substances, such as bacteria and viruses, rendering them incapable of causing harm to the body. They also ingest abnormal cells and old cells, thus clearing the body of their harmful presence.

Assessment and Diagnostic Evaluation

Hematologic Studies:

CBC to identifies the total number of blood cells (**leukocytes, erythrocytes, and platelets**).

As well as the Hb, hematocrite(% of blood volume consisting of erthrocytes), and RBC

Assessment and Diagnostic Evaluation

Bone Marrow Aspiration and Biopsy:

These tests are also used to document infection or tumor within the marrow.

Bone marrow is usually aspirated from the **iliac crest** and occasionally from the **sternum**.

Leukemia

is a **neoplastic** proliferation of one particular cell type (granulocytes, monocytes, lymphocytes, or infrequently erythrocytes or megakaryocytes).

Classification of Leukemia

Leukemia are commonly classified according to the stem cell line involved, either :

lymphoid L.

Acute and chronic

Myeloid L.

Acute and chronic

Nursing Process

The patient with acute Leukemia:

Assessment :

Weakness and fatigue the resulting complication of anemia and infection.

A dry cough, mild dyspnea, and diminished breath sound may indicted a pulmonary infection . The absence of neutrophils delays the inflammatory response against the pulmonary Infection. Bleeding tendancy resulting from platelet low.

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Nursing Diagnosis

Risk for infection and bleeding

Risk for impaired skin integrity

Impaired gas exchange

Impaired mucous membrane

Imbalance nutrition

Acute pain and discomfort

Hyperthermia

Nursing Diagnosis

Hyperthermia

Fatigue and activity intolerance

Impaired physical mobility

Risk for excessive fluid volume

Diarrhea due to altered GI flora due to broad-spectrum antibiotics.

Risk for deficit fluid volume

Self-care deficit

Anxiety

Disturbed body image

Deficient knowledge

Spiritual distress

Nursing Intervention

Prevent infection and bleeding

Managing mucositis

Improving nutritional intake

Easing pain and discomfort

Decreasing fatigue and discomfort

Maintaining fluid and electrolyte balance

Improving self care

Managing anxiety and grief

Encouraging spiritual well-being

Promoting home and community-based care

Lymphoma

Are neoplasm of the cells of lymphoid origin.

Started in lymph nodes but can involve lymphoid tissue in the:

spleen

GI tract

liver and

bone marrow

Classification

1. Hodgkin L.
2. Non Hodgkin L.

Hodgkin L.

Is relatively rare malignancy

Has an impressive cure rate

Common in men than women

Has two peak incidence: the early 20 and after 50 years of age.

Seen more commonly in patient receiving immunosuppressive drugs.

Pathophysiology

unicentric in origin.

initiates in a single node.

spreads by contiguous extension along the lymphatic system.

Causes

The cause is unknown but a viral etiology is suspected.

Clinical Manifestation

Painless **enlargement of one or more lymph nodes** on one side of the neck.

Firm not hard .

Most common sites for LAP are the

cervical

supraclavicular

Midiastinal nodes and iliac and inguinal nodes
or spleen. May be seen on chest x-ray.

Clinical Manifestation

The mass is large enough to compress the trachea. And cause **dyspnea**.

pruritus is common and the cause is unknown.

All organs are vulnerable to invasion by tumor.

Clinical Manifestation

The symptoms result from compression of organs by the tumor, such as:

cough, pulmonary effusion, jaundice, abdominal pain(from splenomegaly or retroperitoneal adenopathy).

Bone pain (from skeletal involvement)

Clinical Manifestation

Herpes zoster infection are common.

Fever

A mild anemia is the most common hematologic finding.

Assessment and Diagnostic Findings

Excisional lymph node biopsy.

Systematic evaluation of the lymph node chains.

Chest x-ray and a CT scan of the chest.

Abdomen and the pelvic to identify the extent of lymphadenopathy within these regions.

Assessment and Diagnostic Findings

CBC

Liver and renal function test

A bone marrow biopsy is performed

Bone scan

Medical Management

A short course (2-4)month of **chemotherapy**
Followed by **radiation therapy**.

Combination chemotherapy with doxorubicin
(A driamycin), bleomycin (Blenoxane) .

Nursing Management

Hodgkin L. is often curable.

The nurse encourage pts. To **reduce other factors that increase the risk of developing second cancer**. Such as use to tobacco and alcohol and exposure to environmental carcinogens and excessive sunlight.

Nursing Management

Screening for late effects of treatment is necessary.

Provide education about relevant self-care strategies and diseases management.

NHLs

Are heterogeneous group of cancer that originate from the neoplastic growth of lymphoid tissue.

Neoplastic cells arise from a single clone of lymphocytes.

NHLs

involve malignant B lymphocyte , only 5%
involve T lymphocytes.

The lymphoid tissues involved are largely
infiltrated with malignant cells.

Spreads cells occurs unpredictably

NHLs

5th most common type of cancer diagnosed in the USA.

The incidence increases each decade of life.

The median age at diagnosis is 67 yrs.

Causes

No common etiological factor has been identified.

Increase in people with immunodeficiencies or autoimmune disorders

Clinical Manifestations

LAP is most common 66%

Fever

Night sweats

Amass in the mediastinum can cause respiratory distress.

Mass can compromise the ureters, leading to renal dysfunction , and splenomegaly, can cause abdominal pain, anorexia, and weight loss.

Assessment and Diagnostic Findings

CT scan of the chest

Bone marrow biopsy

C.S.F

Medical Management

Chemotherapy (cytoxan, vincristine and prednisolon).

Nursing Management

The most commonly used treatment methods are **chemotherapy** and **radiation therapy**.

Chemotherapy causes systemic side effects (myelosuppression, nausea, hair loss, risk for infection).

Nursing Management

Radiation therapy causes **specific side effects** that are limited to the area being irradiated.

The risk of infection is significant. Because the defect of immune response that result from the disease it self.

Assess for airway obstruction, if the mass is near the bronchia, or trachea.

Bleeding Tendency

Failure of normal **hemostatic** mechanisms.

When the sources is **platelet** or **coagulation** factor abnormalities, the site of bleeding can be anywhere in body.

Clinical Manifestations

Petechiae, these are seen on the skin and mucous membranes but also occur throughout the body.

Bleeding from platelet disorders can be severe. **Bleeding occurs deeper** within the body (subcutaneous or IM **hematoma**, hemorrhage into joint spaces).

Clinical Manifestations

Sever bleeding may start several hours after a tooth extraction.

Medical Management

Transfusion of blood products are indicated.

A patient **schedule for an invasive procedures**, including a dental extraction, may **need a transfusion** prior to the procedure to minimize the risk of excessive bleeding.

Nursing Management

Observe carefully and frequent for bleeding.

Avoid activities that increases the risk of bleeding.

Hospitalized patients are **monitored for bleeding** by testing all drainage and excreta (feces, urine, emesis, and gastric drainage) for occult blood.

Outpatients are often given **fecal occult blood screening cards** to detect occult blood in stool.

Idiopathic Thrombocytopenic purpura

Is a disease that affect people of all ages, but it more common in **children** and **young women** . There are two forms of IPT acute and chronic

Pathophysiology

Antiplatelet auto antibodies that bind to the patients that bind to the platelets are found in the blood.

When the platelets are bound by the antibodies. The RES or tissue macrophage system ingests the platelets, destroyed them.

Pathophysiology

The body attempts to compensate for this destruction by increasing platelet production within the marrow.

Clinical Manifestations

Many patient have no symptoms.

And the low platelet count (often less than 20,000/mm less than 5000/mm is not uncommon

Clinical Manifestations

Bruising

Heavy menses

Petechiae on the extremities or trunk

Dry purpura tend to have fewer complications from bleeding than those with bleeding from mucosal surfaces, such as the GI tract (including mouth) and pulmonary system (**hemoptysis**)

Assessment and Diagnostic Findings

Decrease in platelets (less than 20,000/mm) is commonly.

Some patients are found to be infected with *H. pylori* and eradicating the infection may improve platelet counts.

Assessment and Diagnostic Findings

It is unclear why **H. pylori** and IPT are correlated . It is thought that H. pylori may cause an autoimmune reaction.

Medical Management

The **corticosteroid (Prednisolon)** is typically used .

Dexamethason (Decadron) is also effective.

The **immunosuppressive (Azathoprine)**
Imuran.

Chemotherapy agent **Vincristine.**

Nursing Management

Assessment of the patients lifestyle to determine the risk of bleeding from activity.

A careful medication history is also obtained, including use of over-the-counter medication, herbs, and **nutritional supplements**.

The nurse must be alert for **sulfa-containing medication** and the others that alter platelet function(aspirin) .

Nursing Management

Assess any history of recent viral illness and reports **headache or visual disturbance**.

Patients who are admitted to the hospital with wet purpura and low platelet counts should have a **neurological assessment**

Nursing Management

All injection or rectal medication should be avoided.

Rectal temperature measurement should not be performed, because they can stimulate bleeding.

Nursing Management

Patient teaching about **signs of bleeding** (e.g. Petechia, ecchymoses).

The patient should **avoid constipation** and flossing of the teeth.

Electrical razors should be used for shaving and **soft toothbrushes**.

Patient who receiving corticosteroid long time are at **risk for complications**.