# 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 of the 7% - 10% of the normal body weight and amount to 5 – 6L. of volume.

Blood circulating through the vascular system and serving as a link between body organs, and carries o2 absorbed from the lung and nutrients absorbed from gastrointestinal tract to the body cells for cellular metabolism. Blood carries hormones, antibodies, and other substances to their sites of action or use.

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

## Bone Marrow

Is the site of hematopoiesis, In adults, blood cells formation. is usually limited to the pelvic, ribs, vertebrae, and sternum.

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

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

Myeloid stem cells differentiate into 3 broad cell types:

Erythrocytes, Leukocytes and platelets

## 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 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, hematocrit ( % of blood volume consisting of erythrocytes), and RBC

## Bone Marrow Aspiration and Biopsy:

These tests are also used to document tumor or infection 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 tendency resulting from platelet low.

**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 50years 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.

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

pruritis is common  and the cause is unknown.

All organs are vulnerable to invasion by tumor.

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)

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.

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. 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 grow of lymphoid tissue.

Neoplastic cells a rise from a single clone of lymphocytes. involve malignant B lymphocyte , only 5% involve T lymphocytes. The lymphoid tissues involved are largely infiltrated with malignant cells.Spreads cells occurs unpredictably 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 mmunodeficiencies 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( mylosuppression, nausea, hair loss, risk for infection).

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 sever. Bleeding occurs deeper within the body (subcutaneous or IM hematoma, hemorrhage into joint spaces). 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.

The body attempt s 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

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.

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

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

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

All injection or rectal medication should be avoided.

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

bleeding.

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.

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